

Mnemonic Rules for Eponymous Laws

- SRECon EMEA 2024 , 2024-10-29
- Peter Burkholder

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Good afternoon and thanks for being here. Let's dive in...

LANYARD AWAY

Brace yourself...

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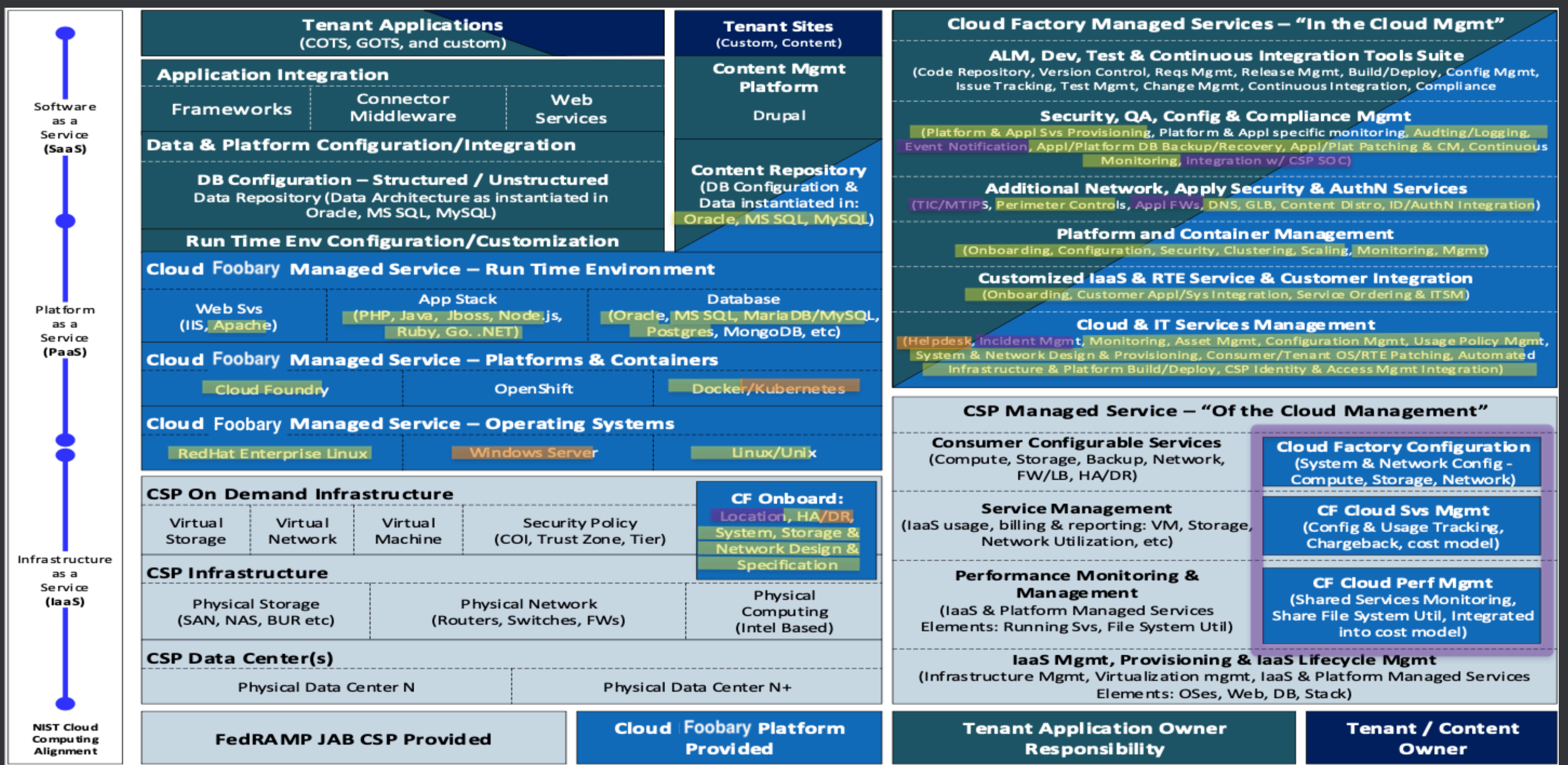
System diagram

In 2019, Another Gov Dept

CTO Office and Platform Team

DevEx focussed, Delivery enabling
security and compliance and governance

Shuffled the deck of technologies and
dealt them



IAAS & DCs, Kubernetes and CloudFoundry & Openshift

Windows and RHEL and "Unix/Linux"

All the Databases, A Drupal cherry on top

TWO Hour provisioning

Asked input, smelled failure, asked about

DevEx, but

told no users

What I said:

- How are you focussing on user experience without any users?
- Agile Development... Blah, blah, blah, Lean Enterprise, MVP

What I needed:

- Eponymous Principle: a law named for a person (from Greek eponymos "given as a name")
- Mnemonic Rule: a trick for recall (from Greek mnēmē "memory")

So about mnemonic tricks, I like this quote:

Mnemonic Tricks

To build a memory ... it has to be a little bit weird

— Per Sederberg (Psychologist, University of Virginia)

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weird, gross, or embarrassing.

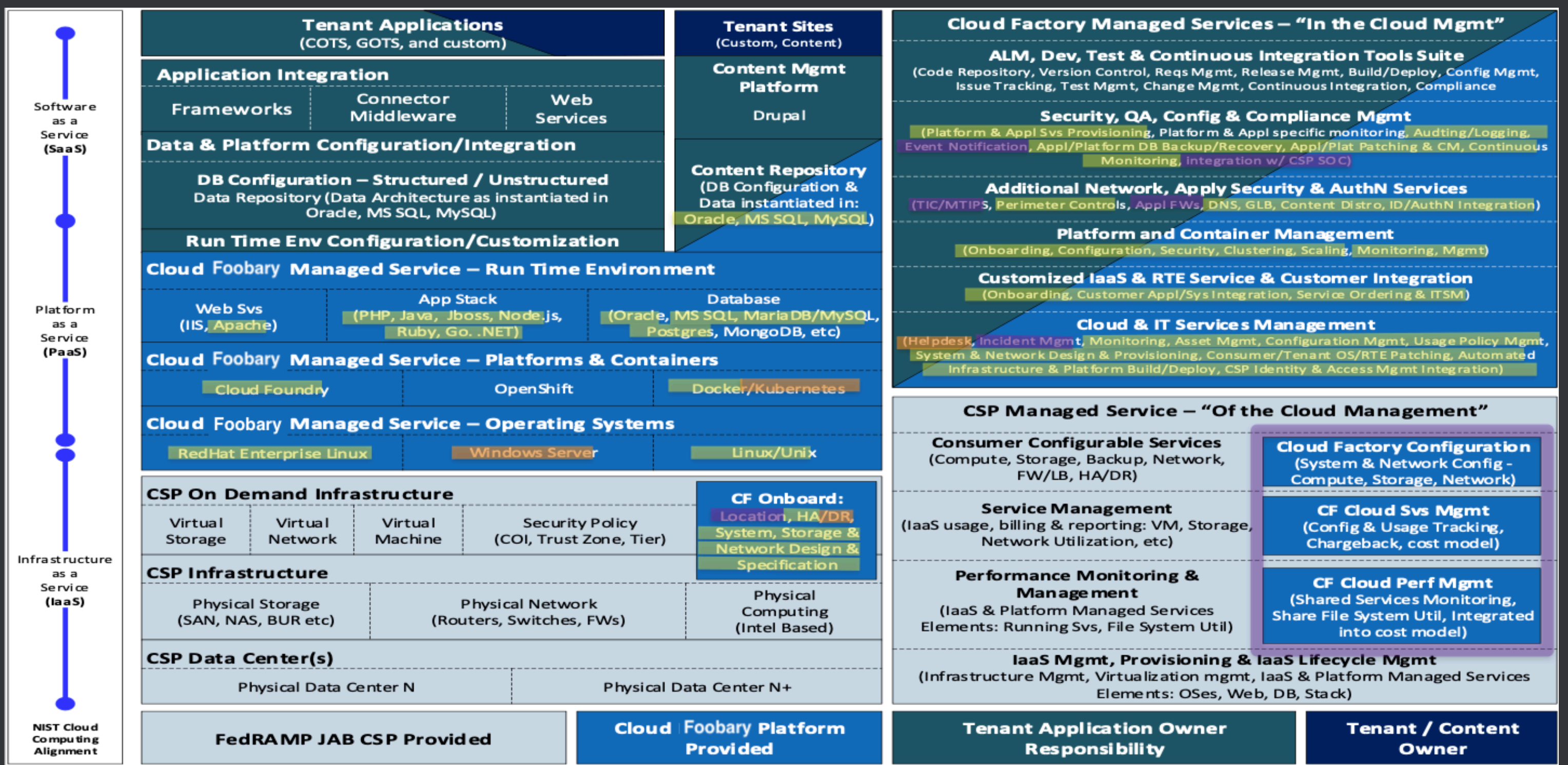
Make them stick.

Make them work

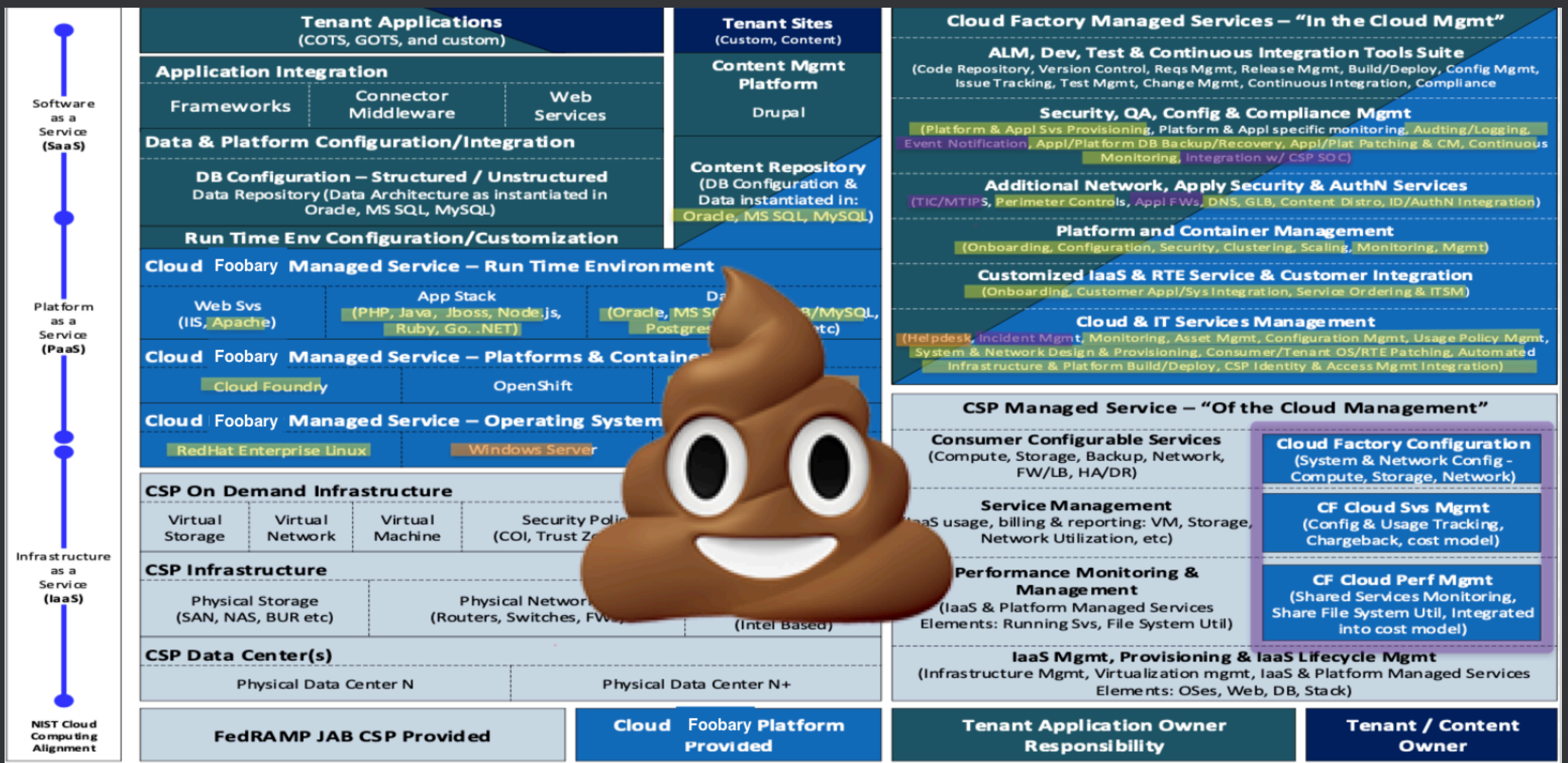
I will not apologize for them,

PRs welcome

My thought process now



I see a hopelessly complex system diagram, and atop that, I visualize a poo emoji.



poop. and not just metaphorical poo but I ponder literal feces and the eons long evolution of excrement, that is:

Evolution of Digestion and 🍌

- Worm Digestion:
 - A simple system that works
 - Eats continually, digestive system produces bile continuously
- Human digestion:
 - A complex systems that works
 - We eat big meals, liver stores bile in the **GALL**bladder
- **Gall**: Mnemonic for ...



Gall's Law

- "A complex system designed from scratch never works, and cannot be patched ... to make it work. You have to start ... with a working simple system."
 - *John Gall, M.D. 1975, General Systemantics*
- Every complex system that works has evolved from a simple system that works.
- Mnemonic: Graphic imagery, digestive system, and **GALL** bladders

And that's IS how I would
respond today w/ complex
proposals

How this works... And
welcome!

Mnemonic Tricks for Eponymous Principles

- Peter Burkholder (*he/him*)
- US Gov (Cloud.gov), Chef Software, NIH, NCAR, PacNW Seismic Lab
- @pburkholder most places (bsky, LI, infosec.exchange)
- Geophysicist / Seismologist / Physics Teacher
- So: THERE WILL BE A **QUIZ**

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Me, some of the places I've worked, and where to find me

The power of Eponymous Principles

- Newton's Laws
 - Law of inertia, etc.
- Murphy's Law
 - Everything that can go wrong will
- Moore's Law
 - Compute power doubles every two years (so far)

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Not merely rhetorical "argument from authority" but should have the backing of experience and empirical evidence.

Newton: Evidence and Theory

Murphy: Lived experience, basis of SRE practice

Moore's Law: faster and cheaper is coming

What makes for a good eponymous principle?

- True - with empirical evidence, or
- True - with weight of lived experience
- Predictive or explanatory value

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Consider Gall's Law in this light: It is true from lived experience and has **PREDICTIVE VALUE.**

Speaking of predictive value...

Any idea how one might find out the fate of Cloud [REDACTED]? (edited)



[REDACTED] 10:36

heya! checking the internal FISMA dashboard, it did not move forward and the overall effort is marked "retired".



Peter Burkhowler (OOO 10/24-11/3) 11:13

Excellent! Confirms Gall's Law

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A few years ago: 2 Weeks provisioning! Over budget
More recently: Collapsed under its own weight
on to our tour of other laws I've found useful. Likely familiar with:

Conway's Law

"Organizations which design systems...are constrained to produce designs which are copies of the communication structures of these organizations"

- *Melvin Conway, 1968*
- Or: Your architecture will mirror your org chart
- *Mnemonic: We **CON**struct systems mirroring the **WAY** we communicate*
- Application: ...

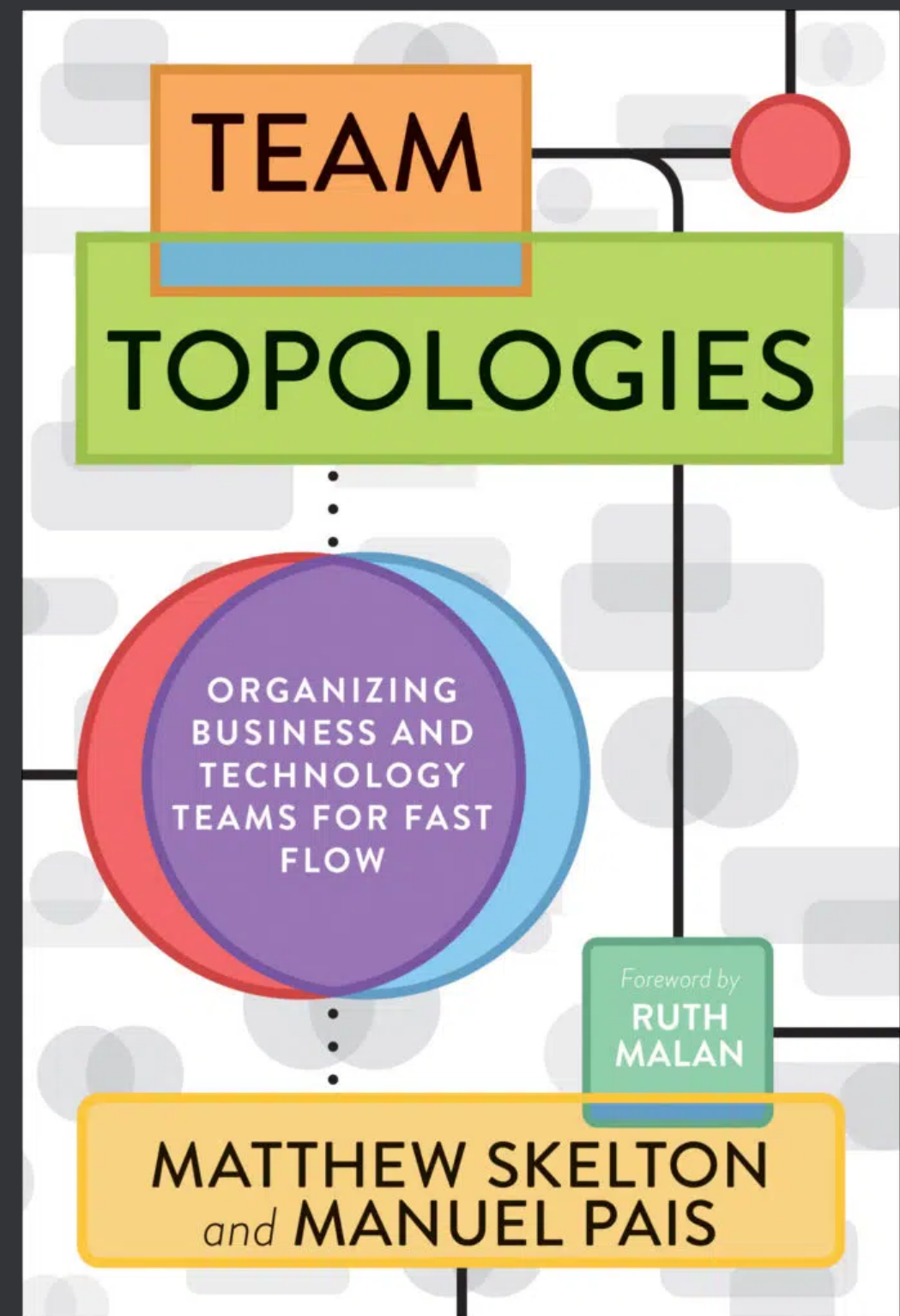
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Pathological organization
cultures and structures
will result in pathological
technical systems.

True by Experience, Predictive
Value

The Inverse Conway Maneuver

- Build teams to achieve the desired architecture
- Tech: Used bounded contexts and APIs along team bounds
- Orgs: Consider *Team Topologies* (Skelton & Pais, 2019)



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Thoughtworks blog post 2015.
Matthew Skelton & Manuel
Pais, 2019

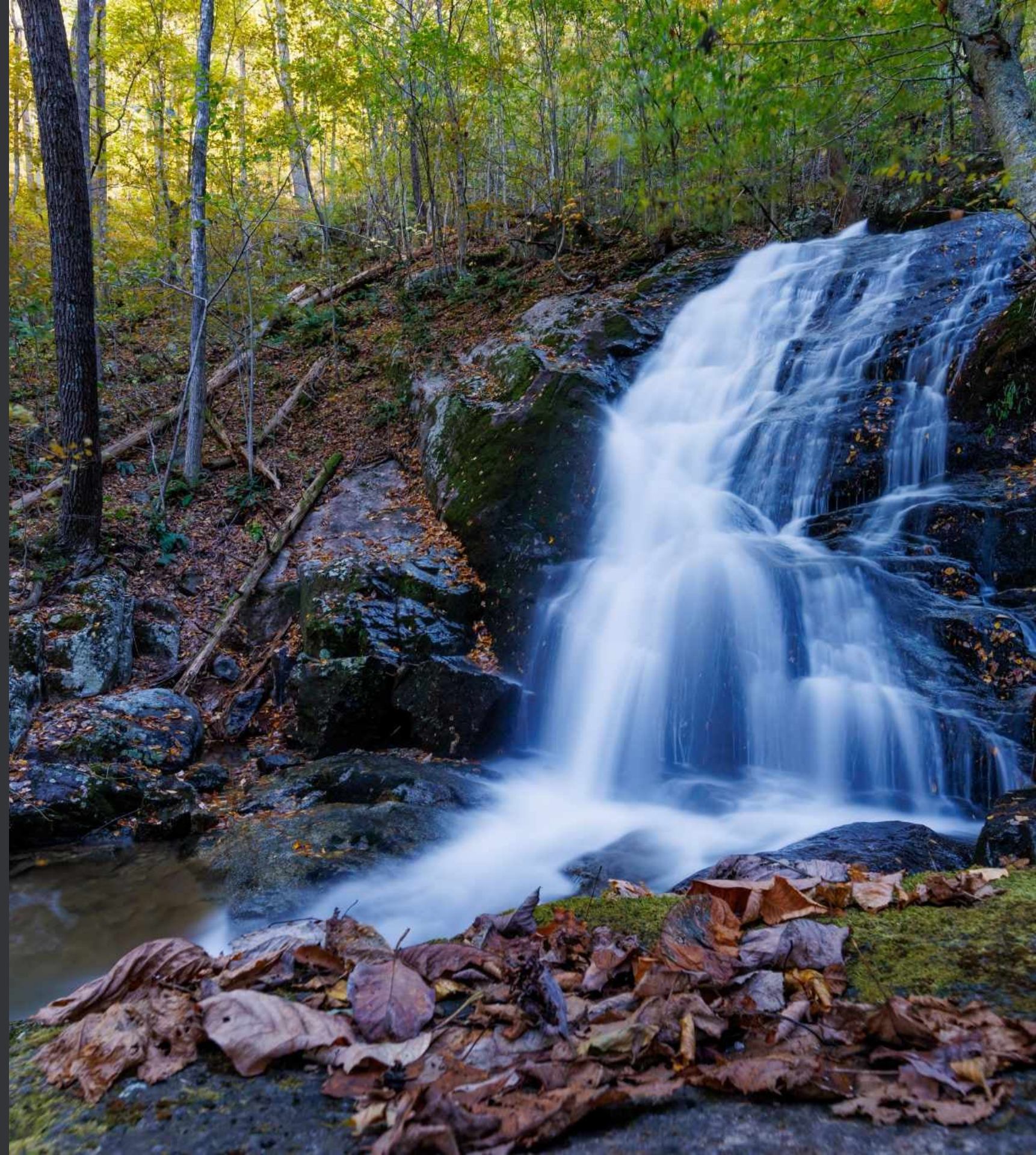
Another old chestnut:

Brooks Law

"Adding [engineers] to a late software project makes it later"

- *Fred Brooks, 1975, The Mythical Man Month*
- Mnemonic: The **BROOK** went over the waterfall¹
- Why: onboarding time + geometrical growth in communication lines

¹James C. Brooks, @shootjamesshoot / instagram



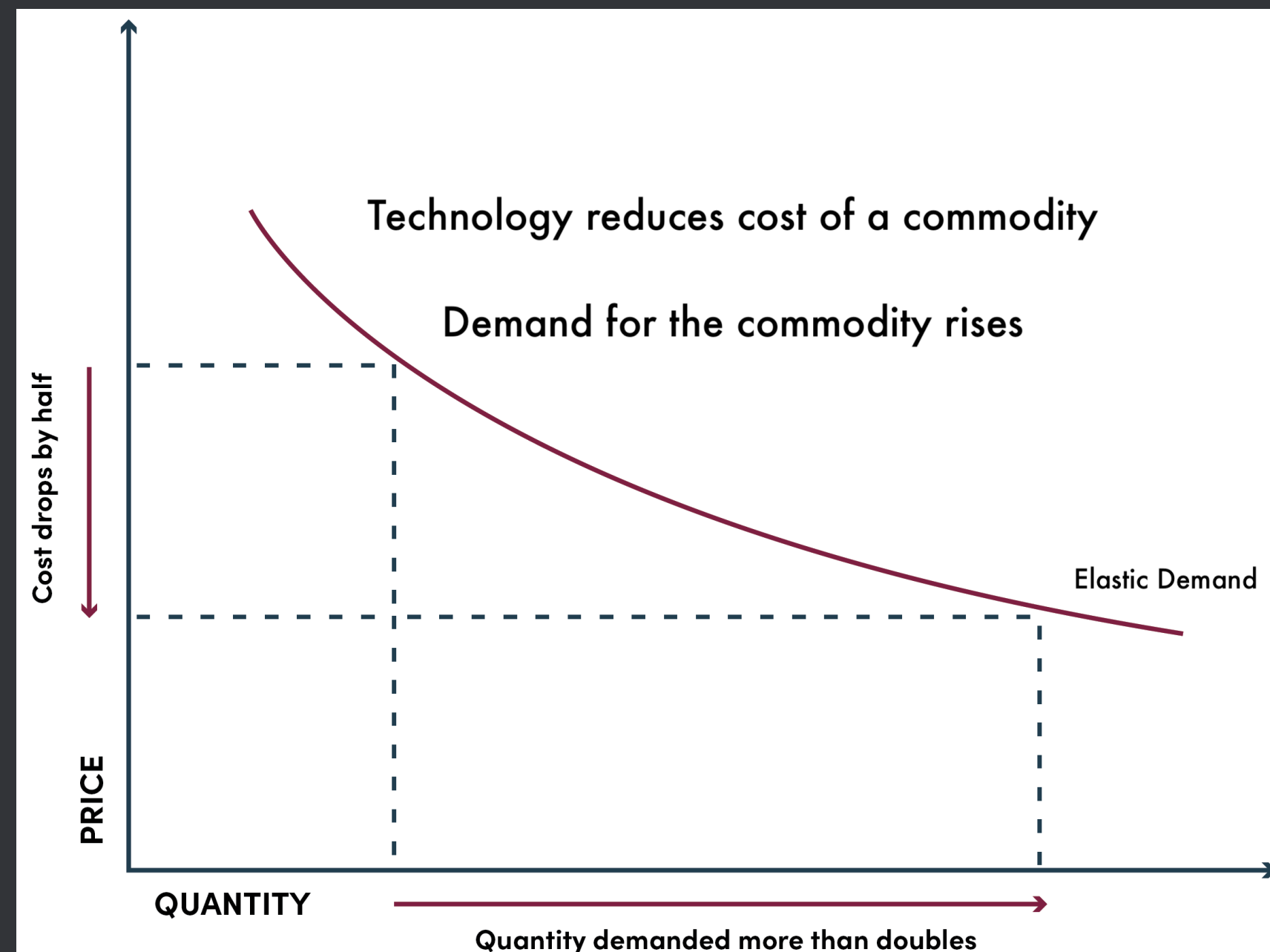
Water fall - Dominant in 1970s
- Not dams and Skyscrapers
Agile too. SW is team
members to communicate

Jevons' Paradox

As the cost of an economically useful commodity decreases, total expenditure on the commodity grows

— *William Stanley Jevons, 1865*

- Examples:
 - 1860s: Coal
 - 1970s: Automobile fuel efficiency
 - 2010s: Cloud spend
- See also: Moore's Law



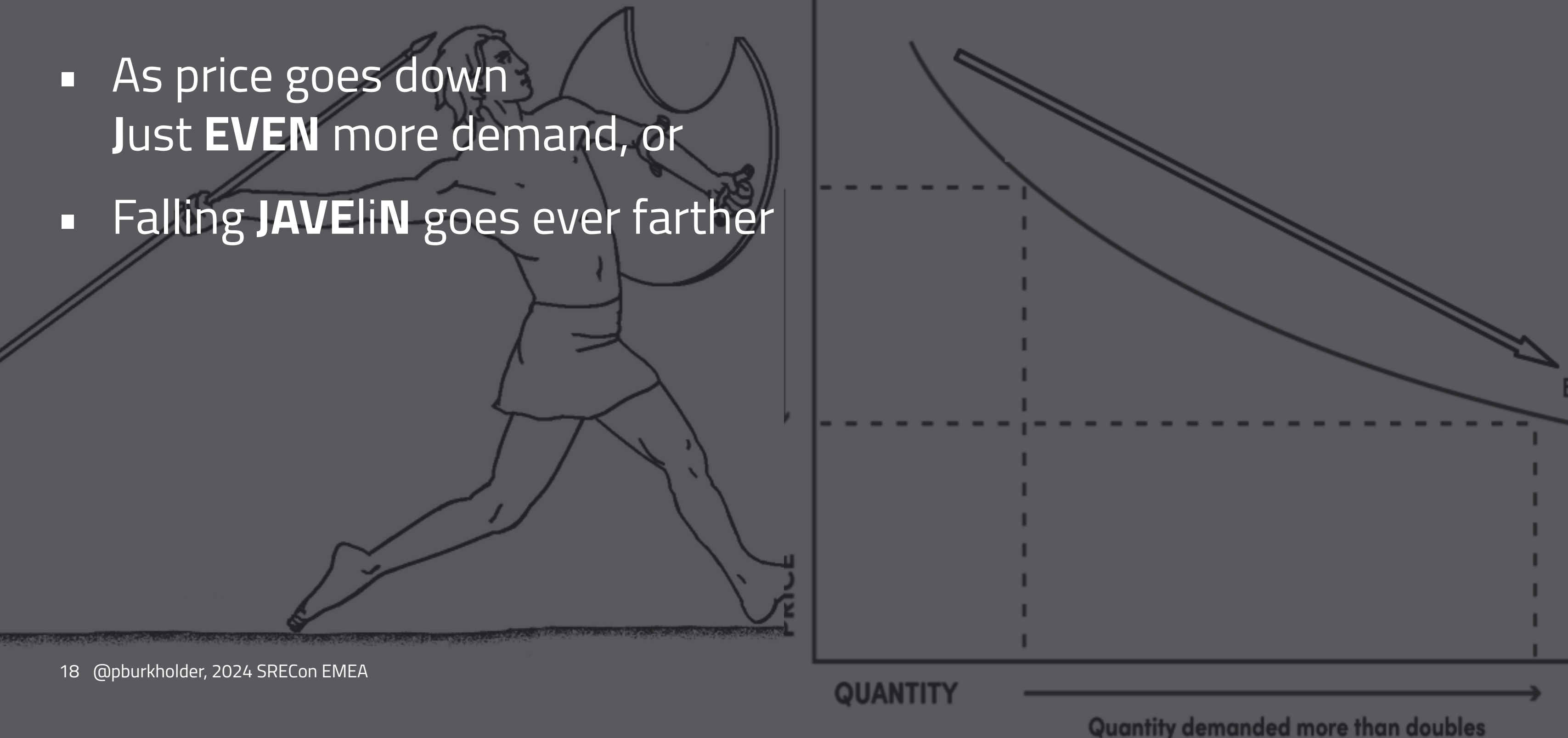
James Watt steam engine. Better
Efficient per unit Coal
Economist expected end to coal
pollution.

Explain the graph

Cloud spend does not go down with
price per compute unit.

Jevons' Mnemonics

- As price goes down
Just **EVEN** more demand, or
- Falling **JAVELiN** goes ever farther



No apologies for mnemonic.

Pareto Principle

The 80/20 rule: 80% of a project is complete in 20% of the time

- *Joseph Juran, inspired by Vilfredo Pareto, 1941*
- Mnemonic:
PARE down **TO** 80% of work with 20% effort
- Statistically: Power-law probability distribution
 - *Pareto Distribution*

Example: In a security context,
focus on the
20% most critical findings,
to take care of 80% of your risk
Many of the things we work
with follow a P.D., which is

Pareto Distributions

$\alpha = \infty$

Many small instances, but a few significant instances may account for most of the impact

$\alpha = 3$

- Rainfall events

$\alpha = 2$

- Earthquake magnitudes

$\alpha = 1$

- Size of files transferred on a network

- Size of human settlements

- Generally: Confounding Factors

Inverse of an exponential curve, with a distinct boundary condition, such as, rainfall will always be a positive number

Pareto Distributions seen in systems both natural and of human origin.

So think in terms of "Confounding Factors", as in this example:

Pareto Principle

"In the last six months, we've been able to meet the needs of one-half of our users. We can meet the needs of the other half in another six months"

- Can you spot the problem here?

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They've focussed on users with only a few factors to consider, ignoring the ones who are don't fit as neatly: names that don't fit your initial data model, or running older devices. You are nowhere near 1/2 done.

Next, consider these words from GK Chesterton:

If you don't see the use of [a fence]... Go away and think.

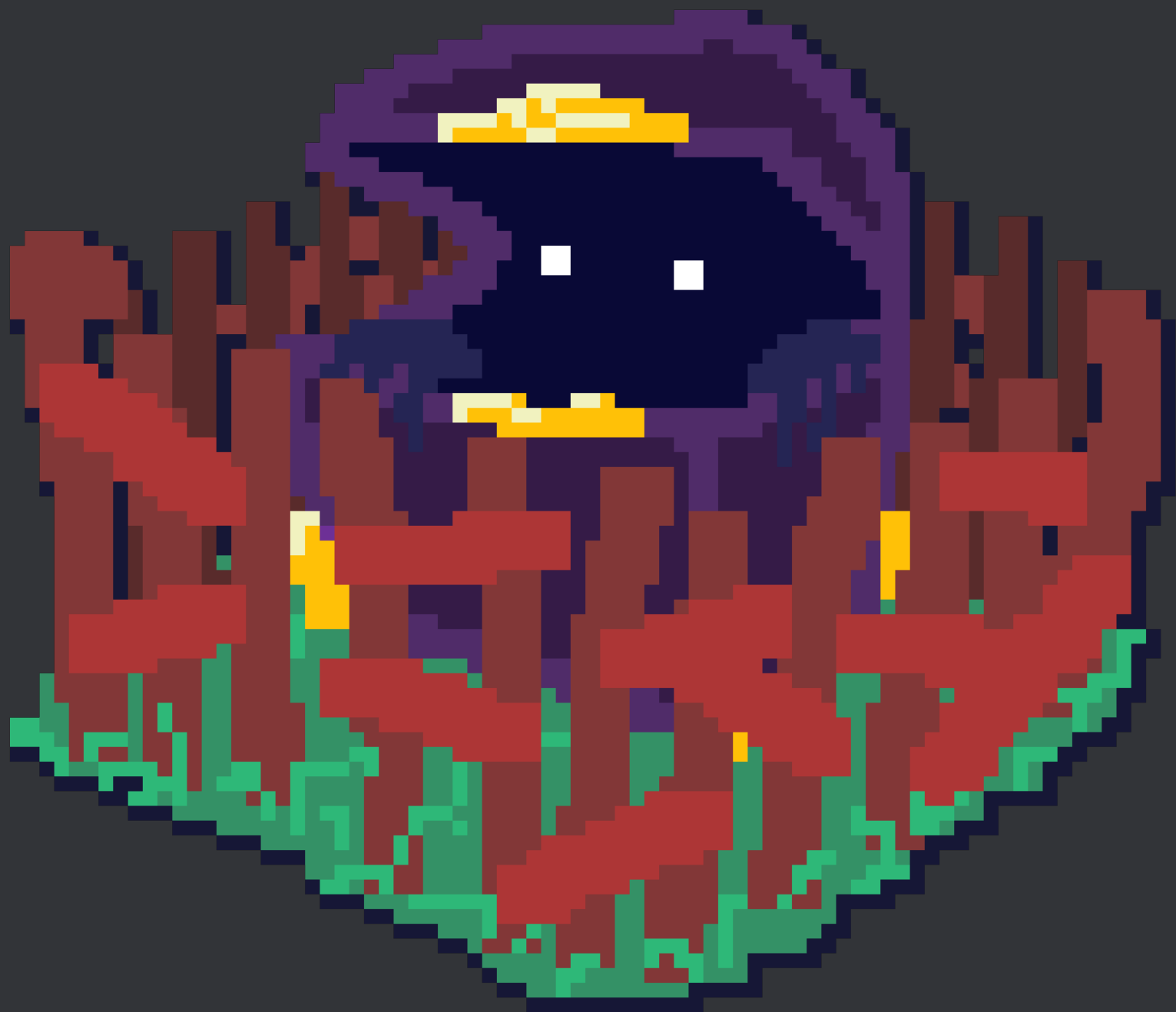
Then, when you can ... tell me the use of it, I may allow you to destroy it.

— G. K. Chesterton, 1929

Chesterton's Fence

Do not remove a fence until you know why it was put up in the first place.

- Mnemonic: That **CHEST** behind the **FENCE** - it may be a danger!
- Application:
 - Code Comments, ADRs (Architectural Decision Records), Pull/Merge Requests
 - Employee Retention



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Any project more than a year old, especially platforms...

Meme Laws

- ~~True with empirical evidence~~
- ~~True with weight of lived experience~~
- Feel true
- ~~Predictive or explanatory value~~
- Build Community

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Meme Laws useful to build community, and help make connections. Some examples:

Meme Laws

Hanlon's Razor

"Never attribute to malice what is better explained by incompetence"

-- *Unknown*

* Mnemonic: Never attribute to *conspiracy* what is better explained by incompetence

-- Apocryphally **Robert A. Heinlein**

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Galaxy
SCIENCE FICTION

SEPTEMBER 1951
35¢
ANC



No know attribution for anyone named Hanlon, so mnemonic is recall the SF writer's

Robert Heinlein's CONSPIRACY based fiction the PuppetMasters

Cunningham's Law

"The best way to get the right answer on the internet is not to ask a question; it's to post the wrong answer."

-- *Ward Cunningham*

* Mnemonic: Knowledge is COMING HOME when you post the wrong answer

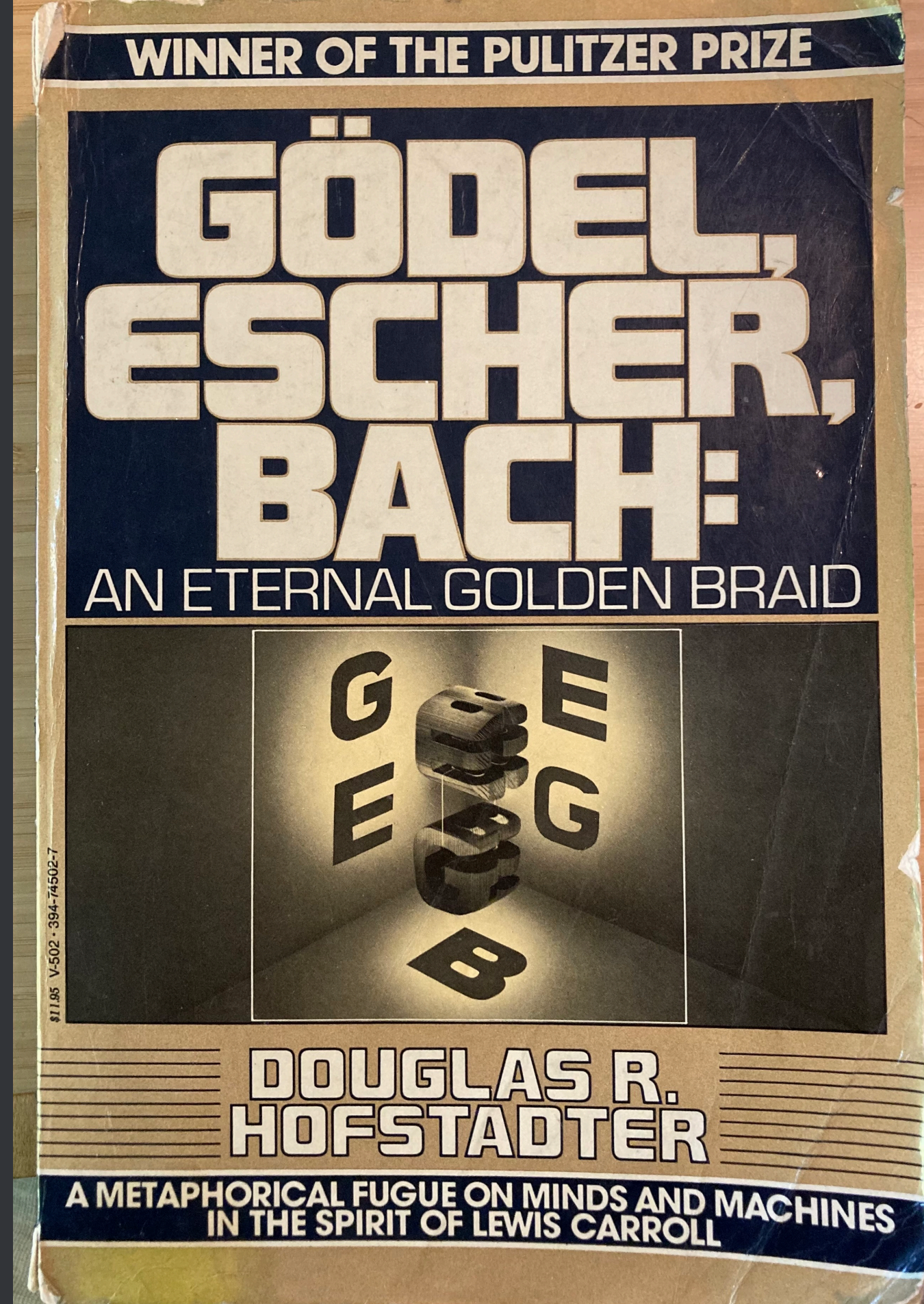
Hofstadter's Law

"It always takes longer than you expect, even when you take into account Hofstadter's Law."

-- *Douglas Hofstadter, 1979*

* Mnemonic: **Ha! Later...**

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TEXT: Then: Hofstadter's Law may not be a meme law, straddle between meme laws and useful laws.

Whong's Law

"Every government agency, everywhere is working on a "new system"; It will solve all of their data problems and will be ready to use in 18-24 months."

-- *Chris Whong, 2018*

- Mnemonic: Data throng done long? Wrong, says Whong.
- See also: Gall's Law, Pareto Principle

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Not just gov, but any large legacy organization. Remember the Cloud Platform?

Also a Whong's Law example

The timeline is key. system will still be 18-24 months away.

Predictive value: ask if it can solve 1 problem for 1 user in 1 month.

Quiz Time

- Galls' Law
- Conway's Law
- Brooks' Law
- Jevon's Paradox
- Pareto Principle
- Chesterton's Fence
- Hanlon's Law
- Cunningham's Law
- Hofstadter's Law
- Whong's Law

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I'm going to count down from three, and you'll call out the answer. Are you ready for a quiz? 3,2,1, (Try again)

What law explains this?

To meet the specified contract deadlines, we've added a DevOps team. But now we're further behind schedule!

Answer:

- Brooks's Law
- Whong's Law
- Conway's Law
-

What law explains this?

To meet the specified contract deadlines, we've added a DevOps team. But now we're further behind schedule!

Answer:

- **Brooks's Law**
- ~~Whong's Law~~
- ~~Conway's Law~~
- Mnemonic: The **BROOK** goes over the waterfall

Fill in the blank

We have five teams assigned to a system that only has three major components. Time to apply an Inverse _____ Maneuver so we don't end up with five subsystems.

Answer: **CONWAY**

We have five teams assigned to a system that only has three major components. Time to apply an Inverse **Conway** Maneuver so we don't end up with five subsystems.

- We **CON**struct systems the same **WAY** we're organized

Fill in the blank

This proposed architecture is too complex. We'll have to start with a simpler initial *working* solution, otherwise we're doomed by _____ Law.

Answer: Gall's Law

This proposed architecture is too complex. We'll have to start with a simpler initial *working* solution, otherwise we're doomed by **Gall's Law**.

- 🍌 architecture -> digestive evolution -> **GALL** bladder

How do you respond?

Argument: We're vastly improving the energy efficiency of Large Language Models, so don't worry about the environmental impact.

Response: Sorry, but are you familiar with _____ ??

This one is a bit harder

Answer: Jevon's Paradox

Argument: We're vastly improving the energy efficiency of Large Language Models, so don't worry about their environmental impact.

Response: Sorry, but are you familiar with **Jevons' Paradox**??

Mnemonic: Just **EVEN** more demand as efficiency improves.



Heather Battaglia (18F) (DEN) Nov

27th at 6:26 PM

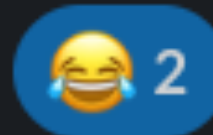
why is it that no matter how realistic I try to be with my time estimates, everything is always at least double the time I think it is

3 replies



James Tranovich (18F - SF - he/him)

13 days ago



James and Heather Q



Heather Battaglia (18F) (DEN) Nov

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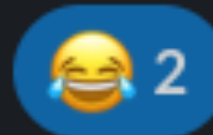
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James Tranovich (18F - SF - he/him)

13 days ago

Hofstadter's law!



James and Heather A

Thank you

And laws to look forward to in a future version

- Goodhart's Law
- Overton Window
- G.I. Joe Fallacy
- Dunning Kruger
- Metcalf's Law
- Parkinson's Law
- Dunbar's Number

And thank you to Usenix & the SRECon organizers

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Effie and Murali

Resources

- This talk: <https://github.com/pburkholder/eponymous-principles>
- Laws of Software: <https://laws-of-software.com>