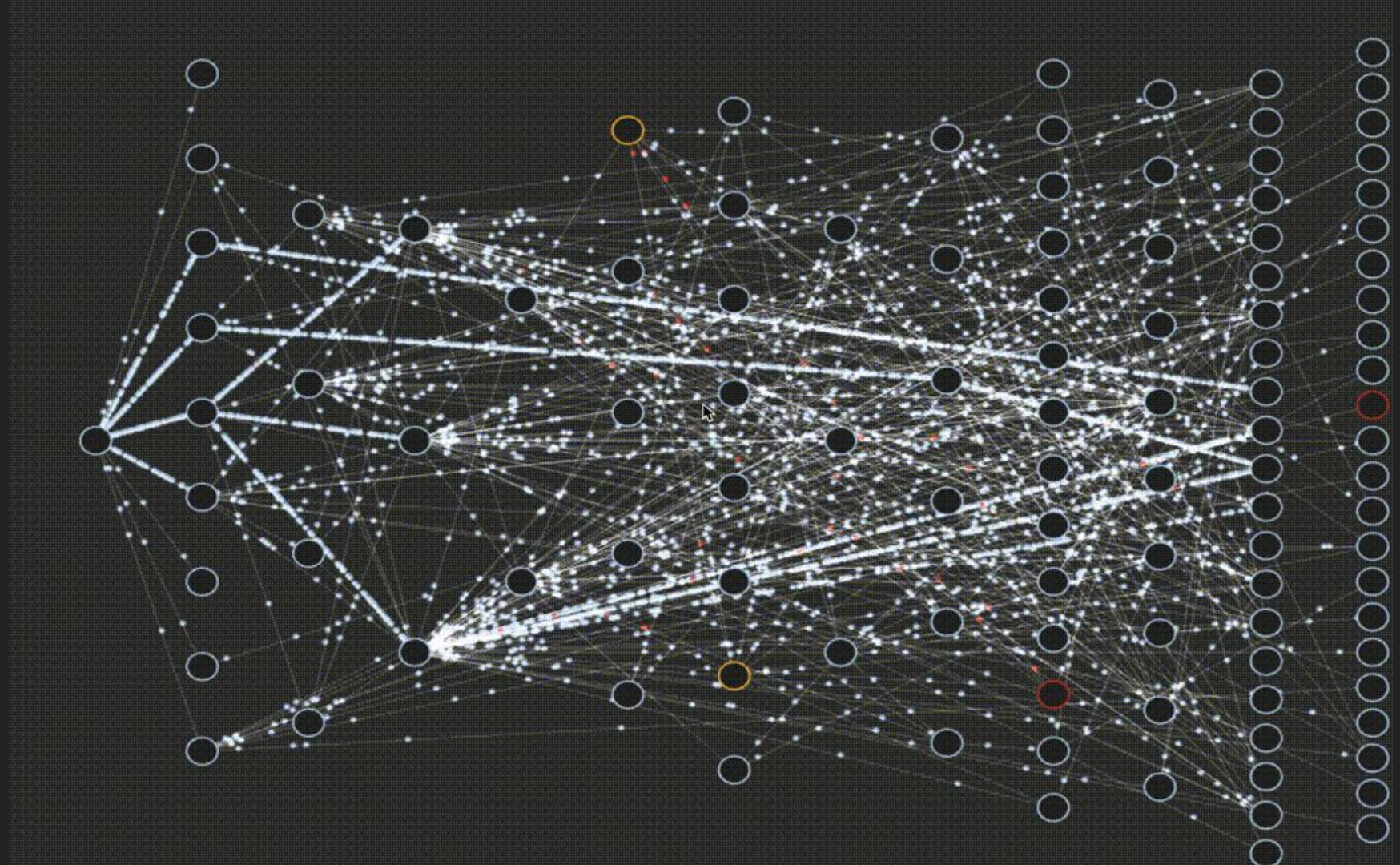
Complexity: The Crucial Ingredient in Your Kitchen

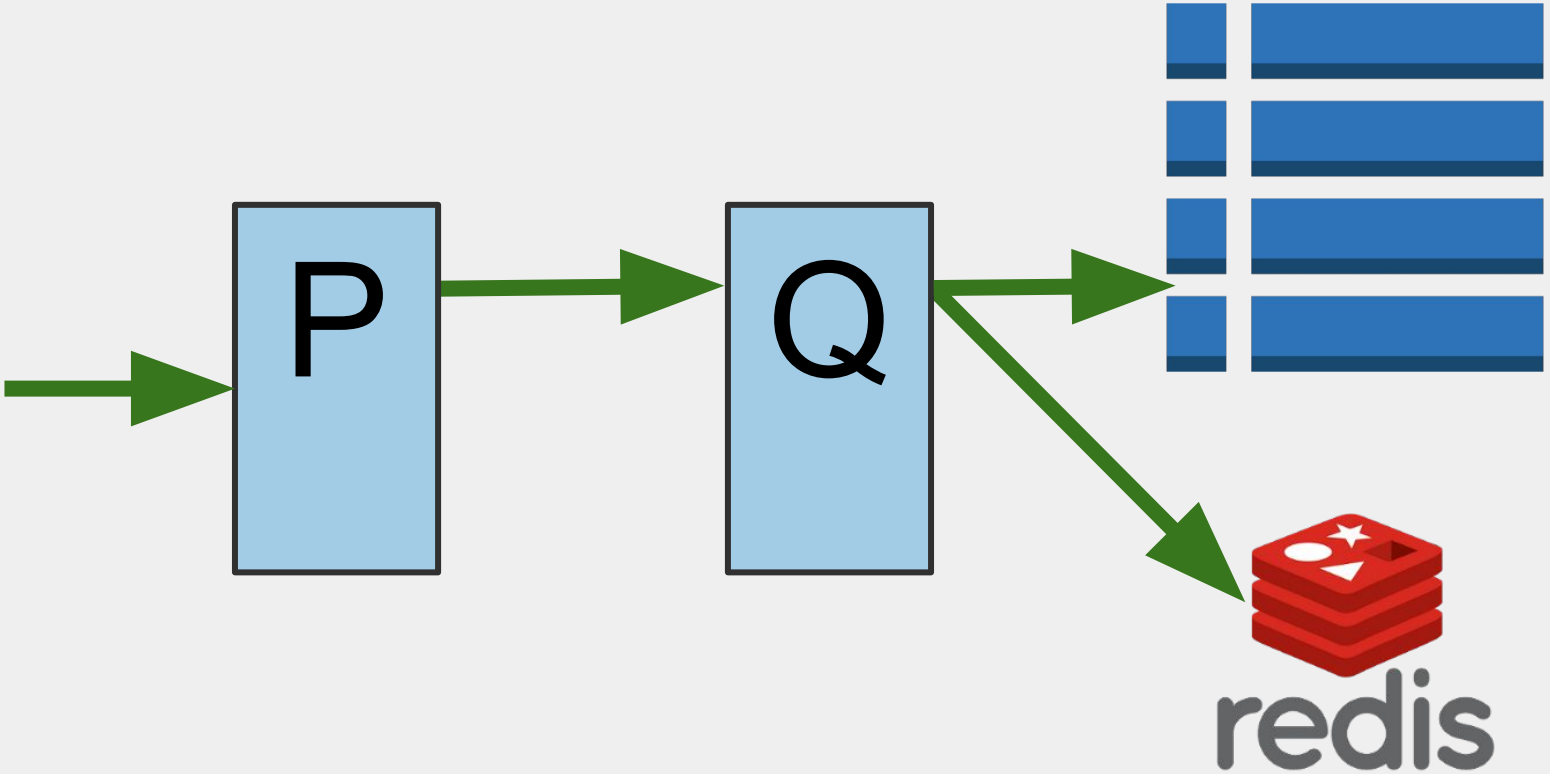
@CaseyRosenthal

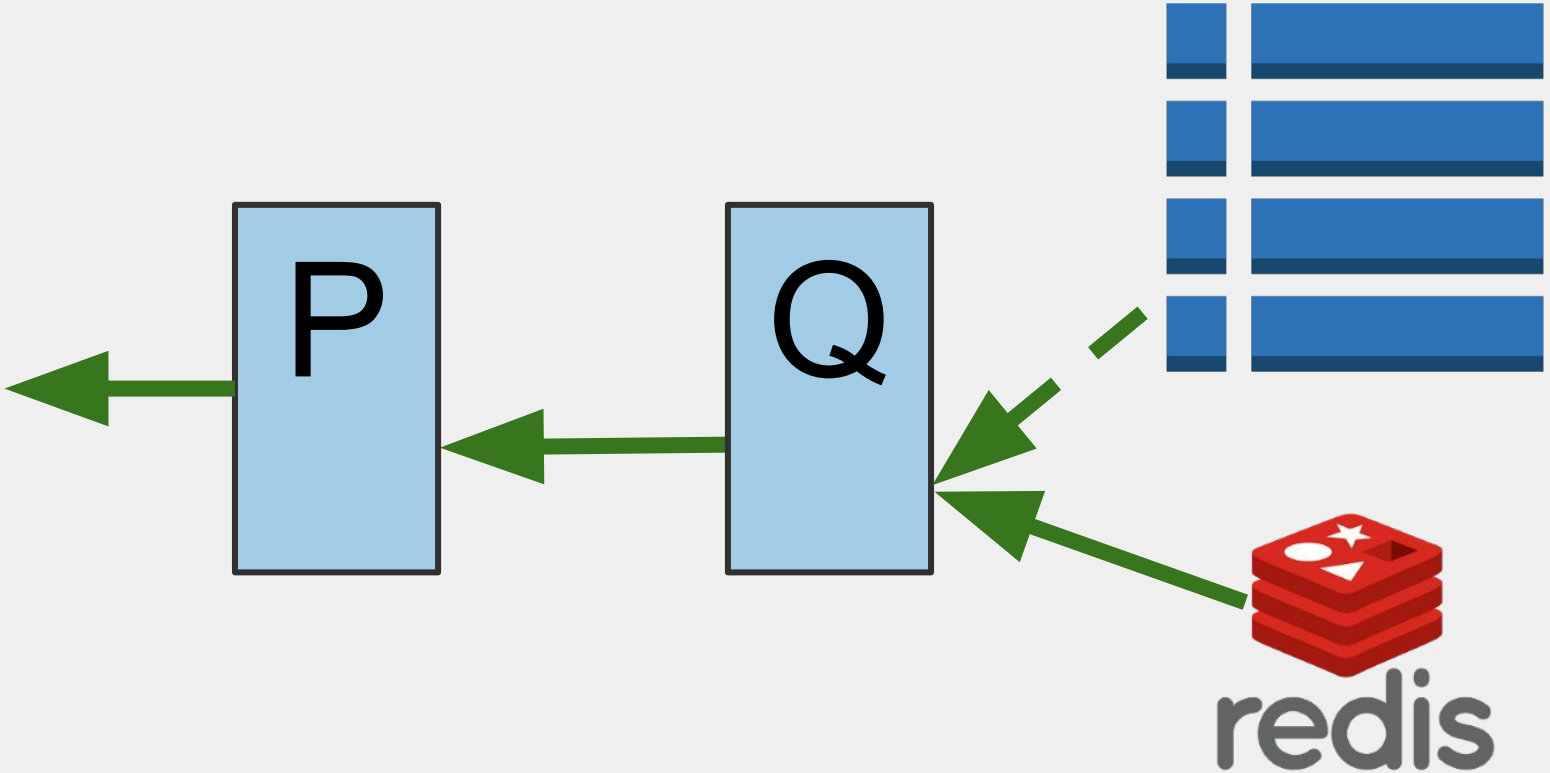
@CaseyRosenthal

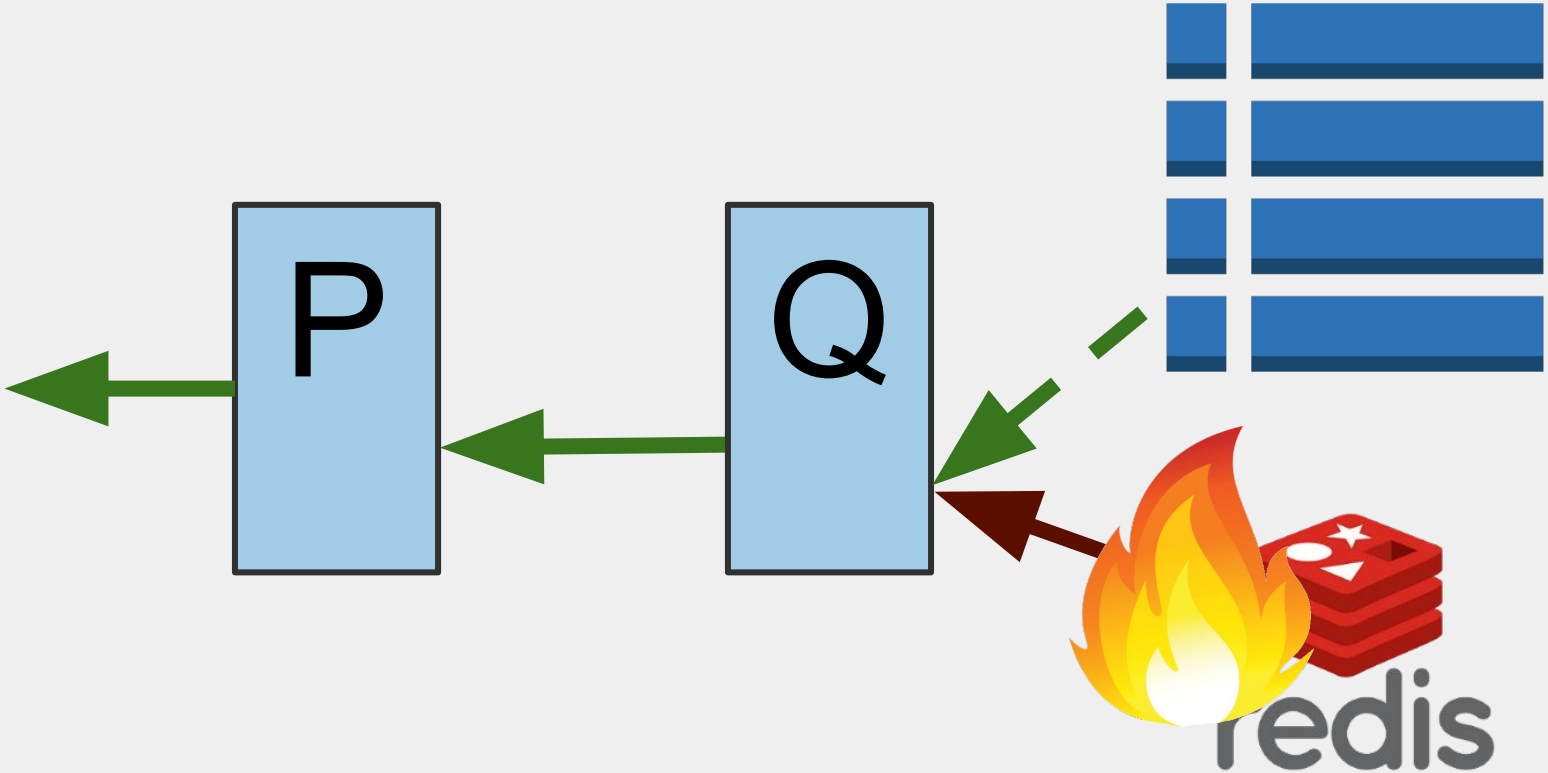


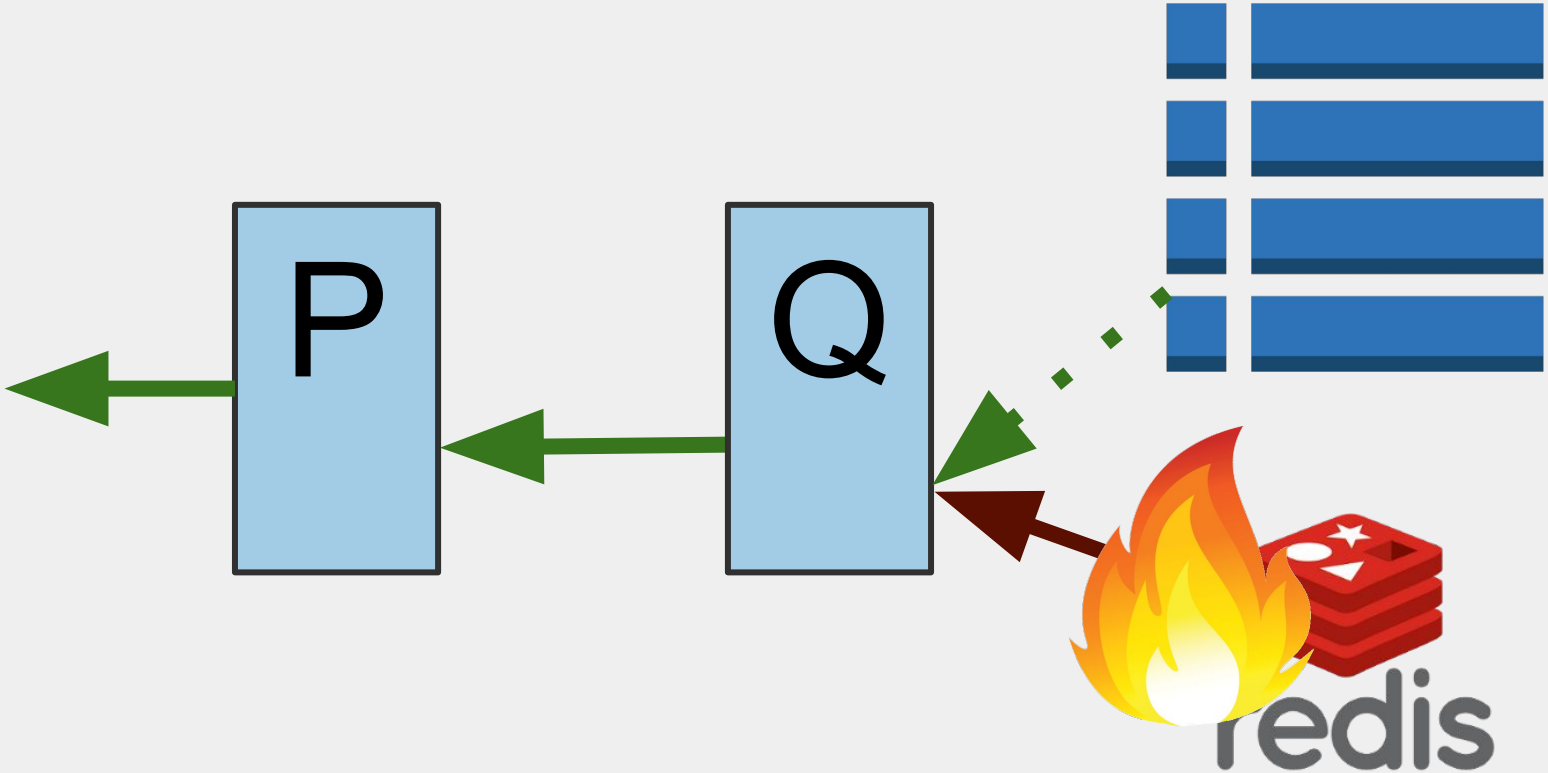
What could go wrong in a complex system?

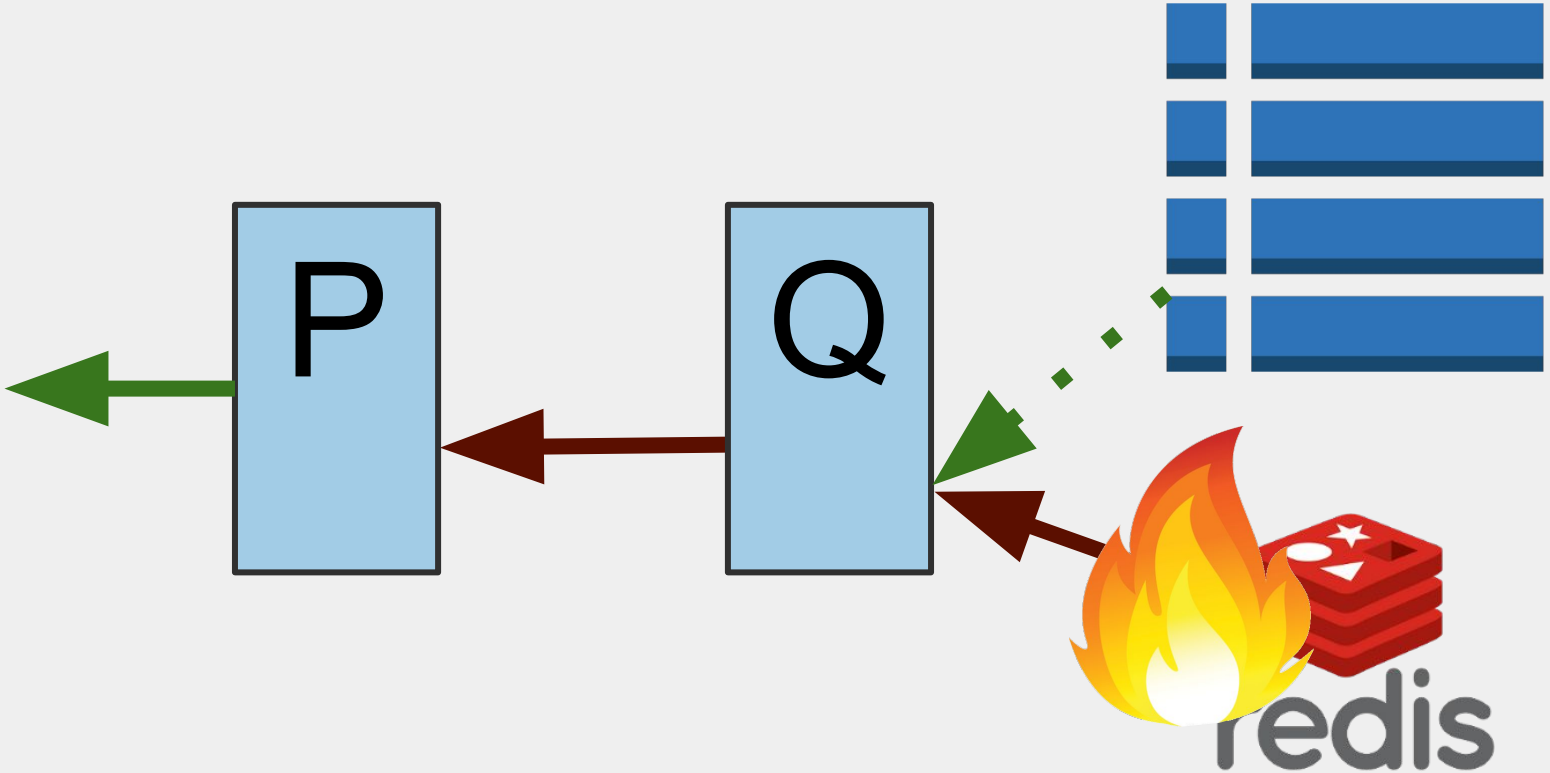
@CaseyRosenthal

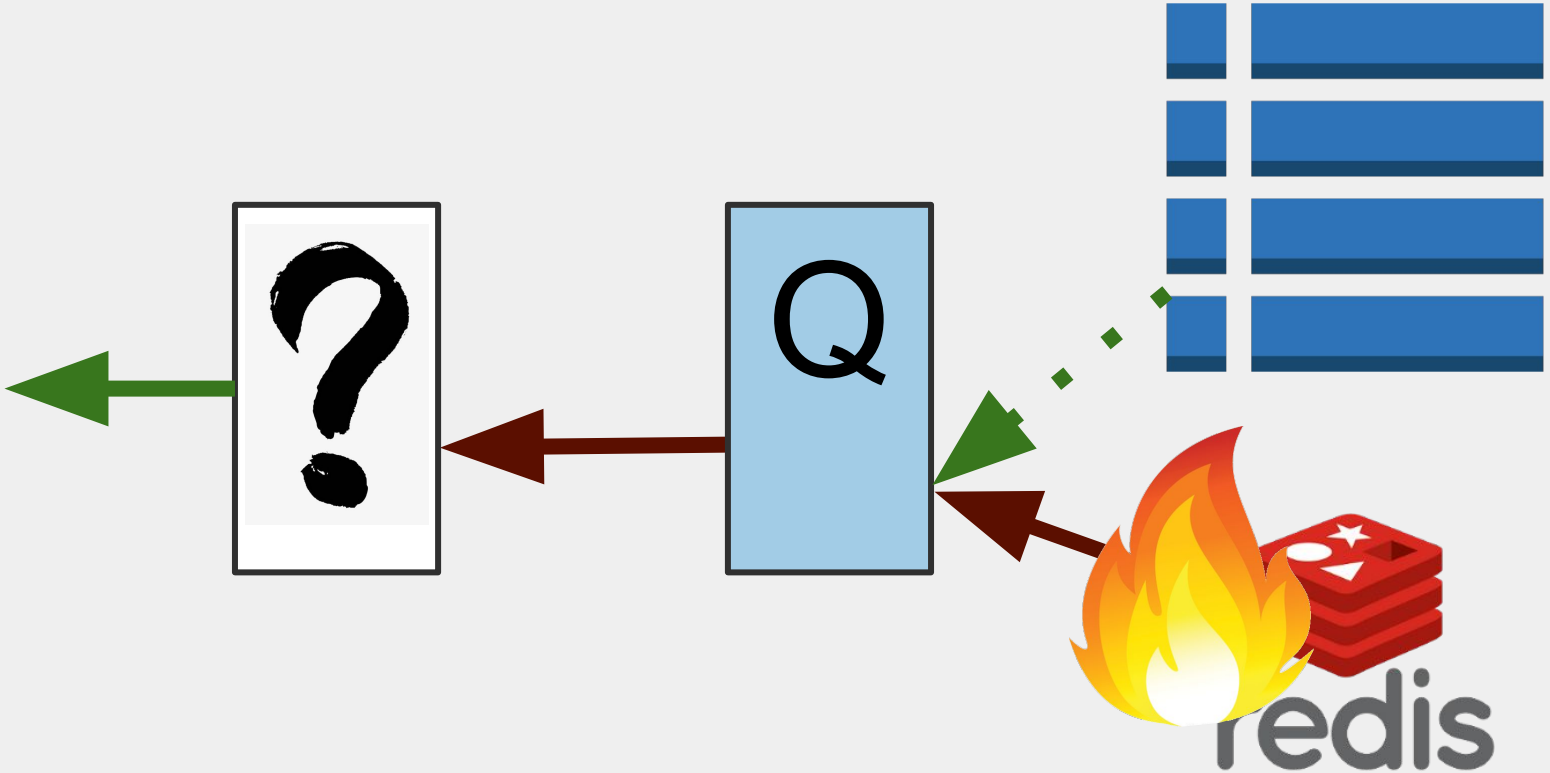

P
Q
redis

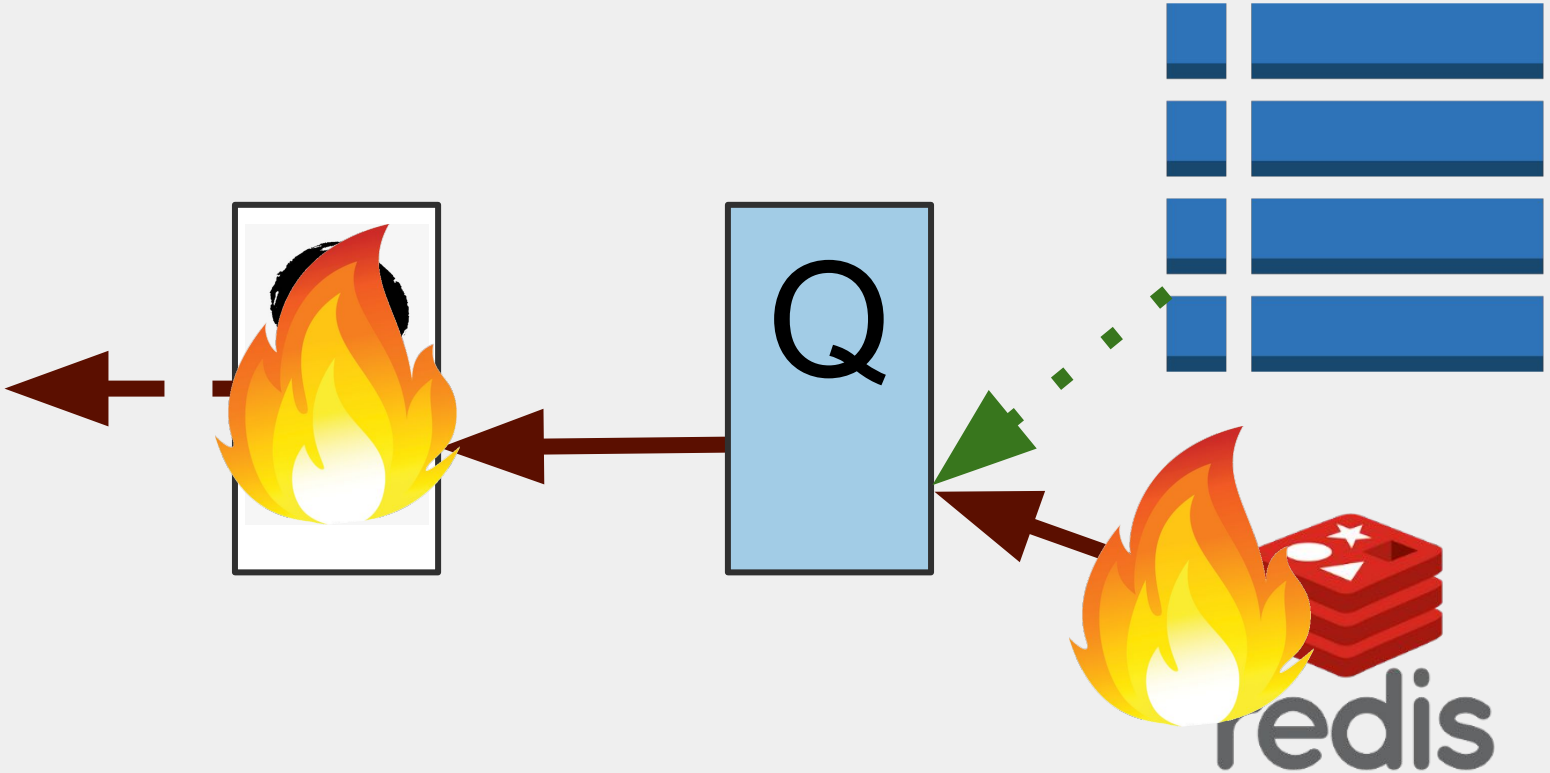

P
Q
redis


P
Q
redis


P
Q
redis


P
Q
redis


?
Q
redis


Q
redis

All components could be 100% correct, and yet the system exhibits undesirable behavior.

@CaseyRosenthal

How do we survive the undesirable effects of complex systems?

@CaseyRosenthal

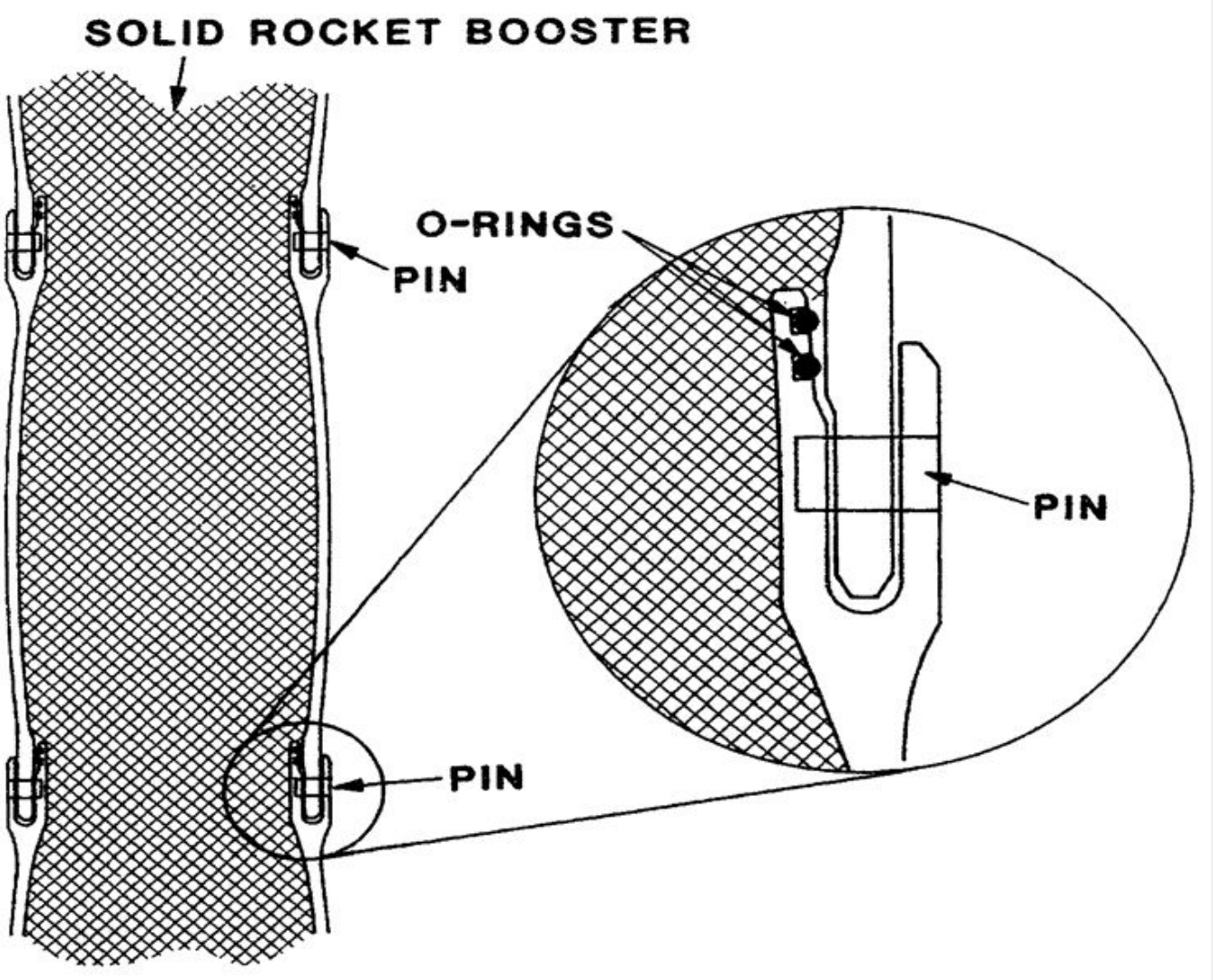
How do we
make systems reliable?

@CaseyRosenthal

Redundancy

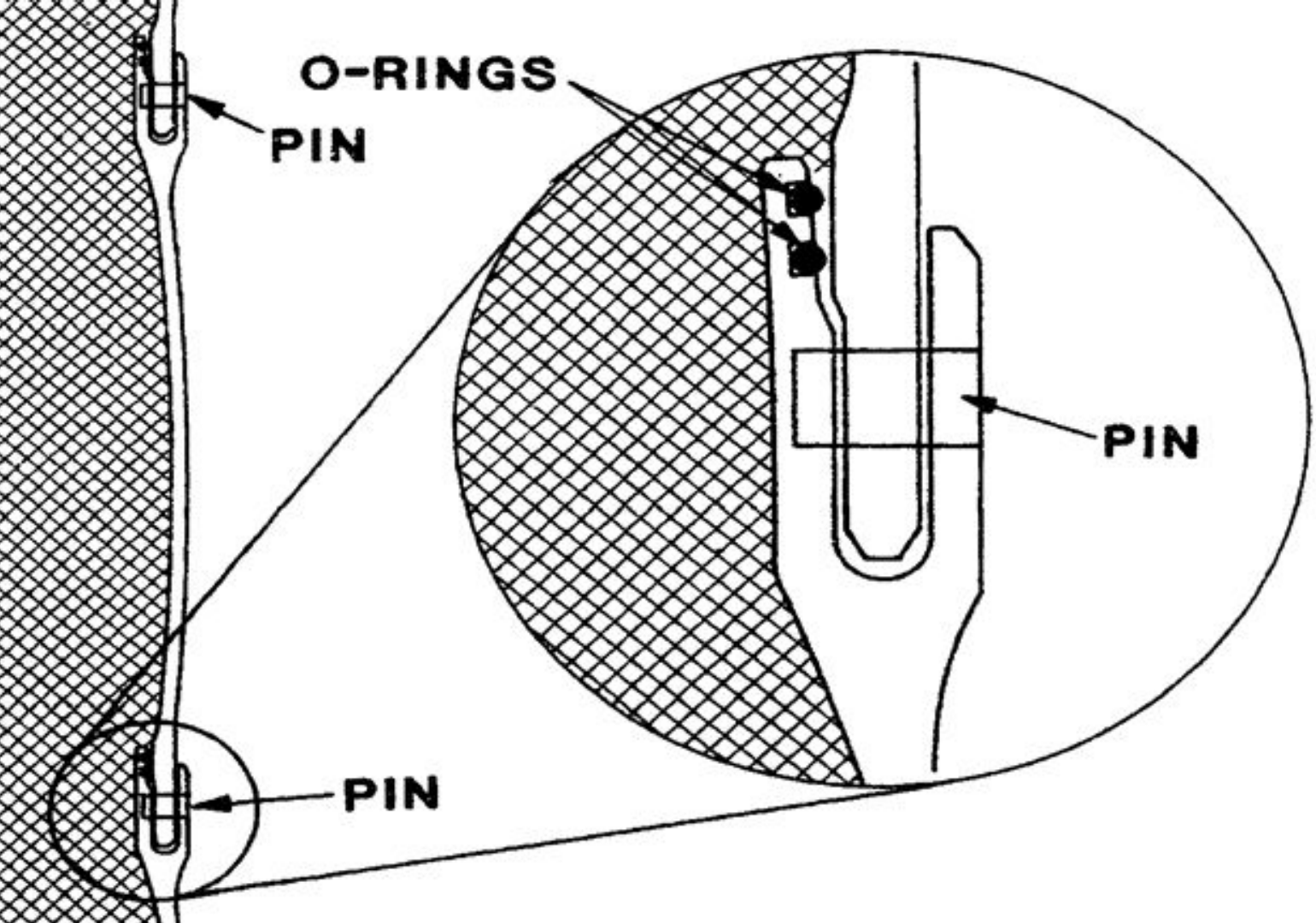
@CaseyRosenthal




SOLID ROCKET BOOSTER
O-RINGS
PIN
PIN
PIN






O-RINGS
PIN
PIN
PIN



- Functionality has redundancy.

@CaseyRosenthal

- Functionality has redundancy.
- Deviation is within experience base.

@CaseyRosenthal

- Functionality has redundancy.
- Deviation is within experience base.
- Issue is self-limiting.

@CaseyRosenthal

How do we
make systems reliable?

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Avoiding Risk

@CaseyRosenthal







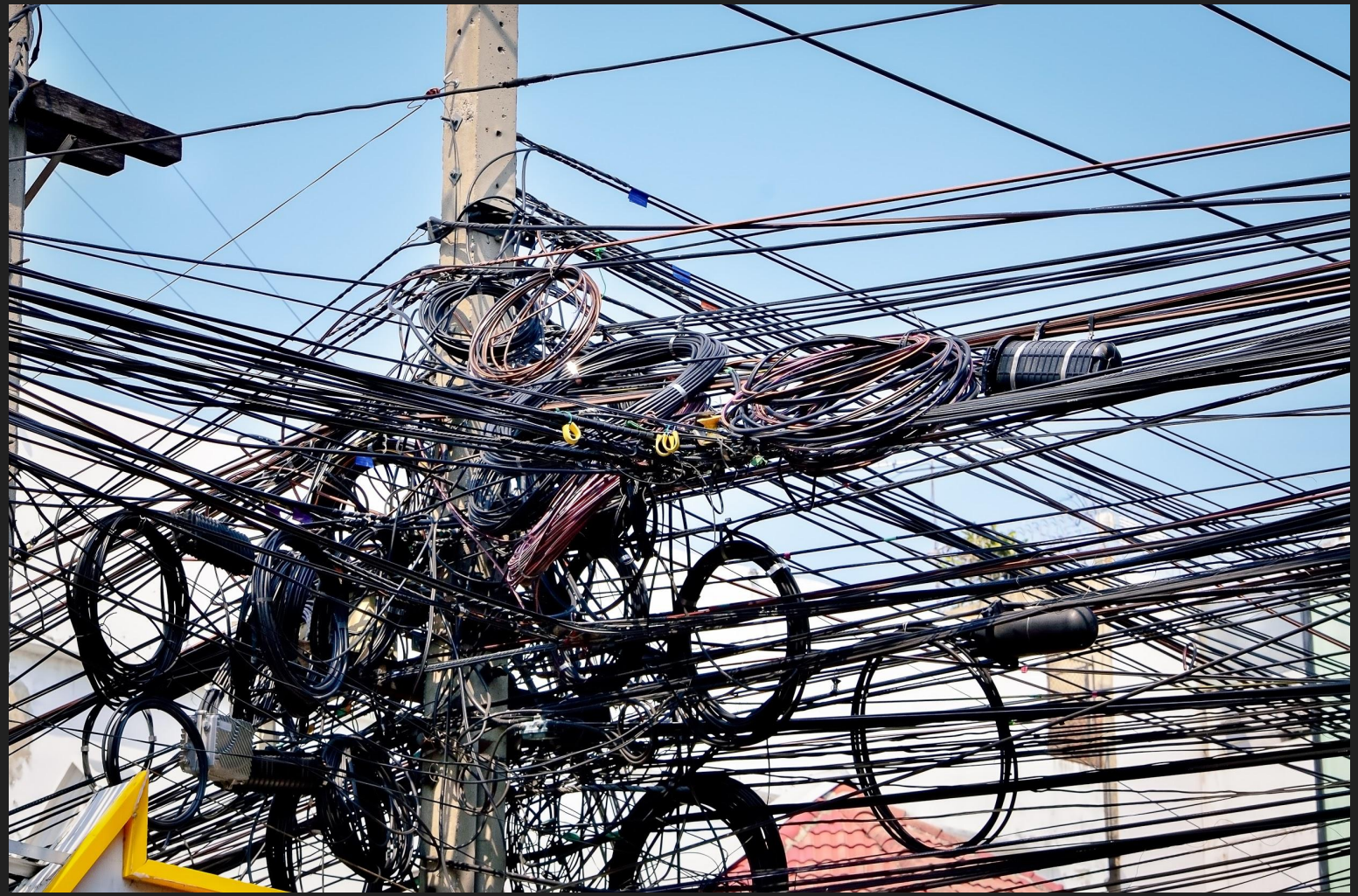






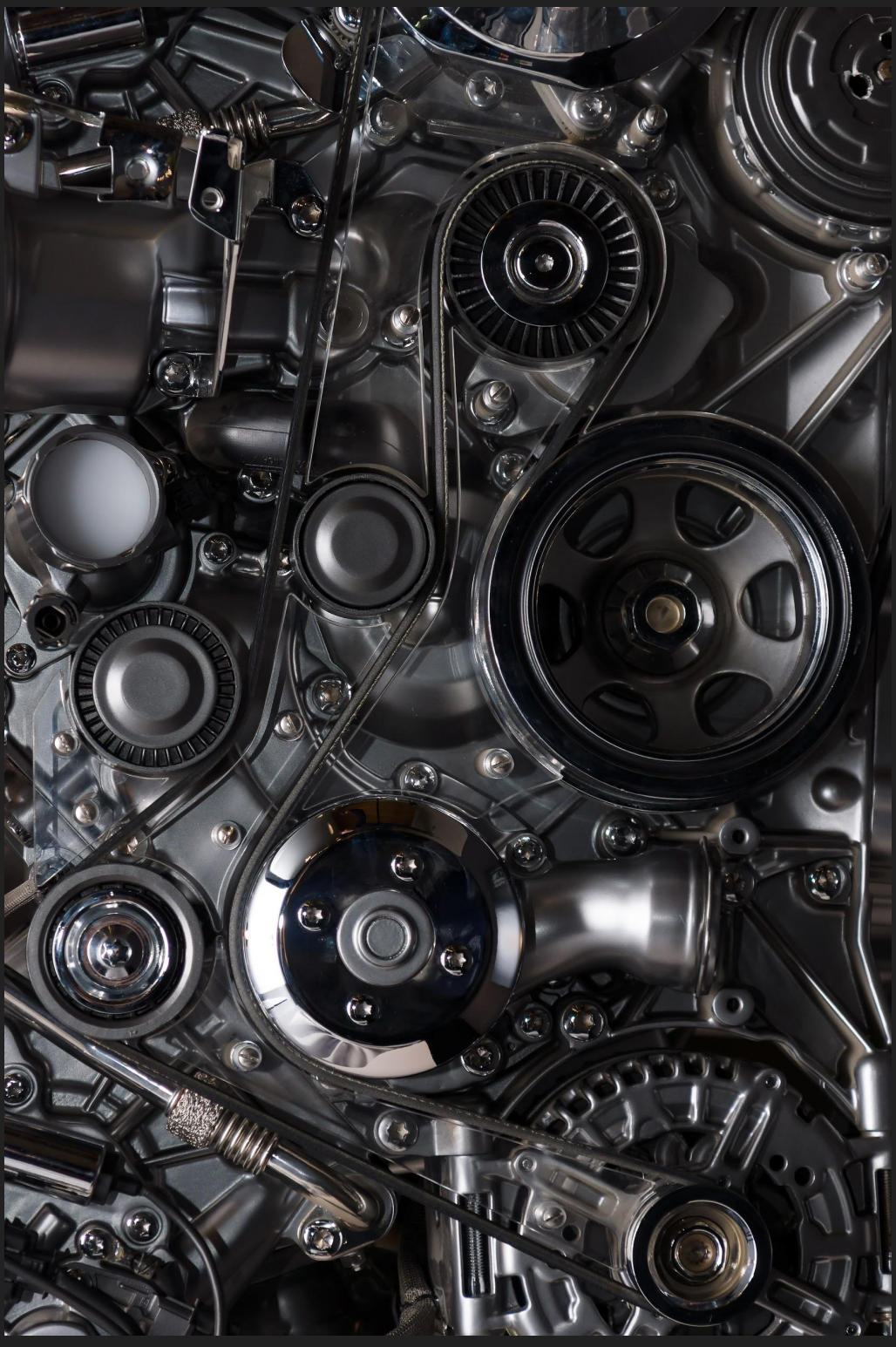
Simplicity

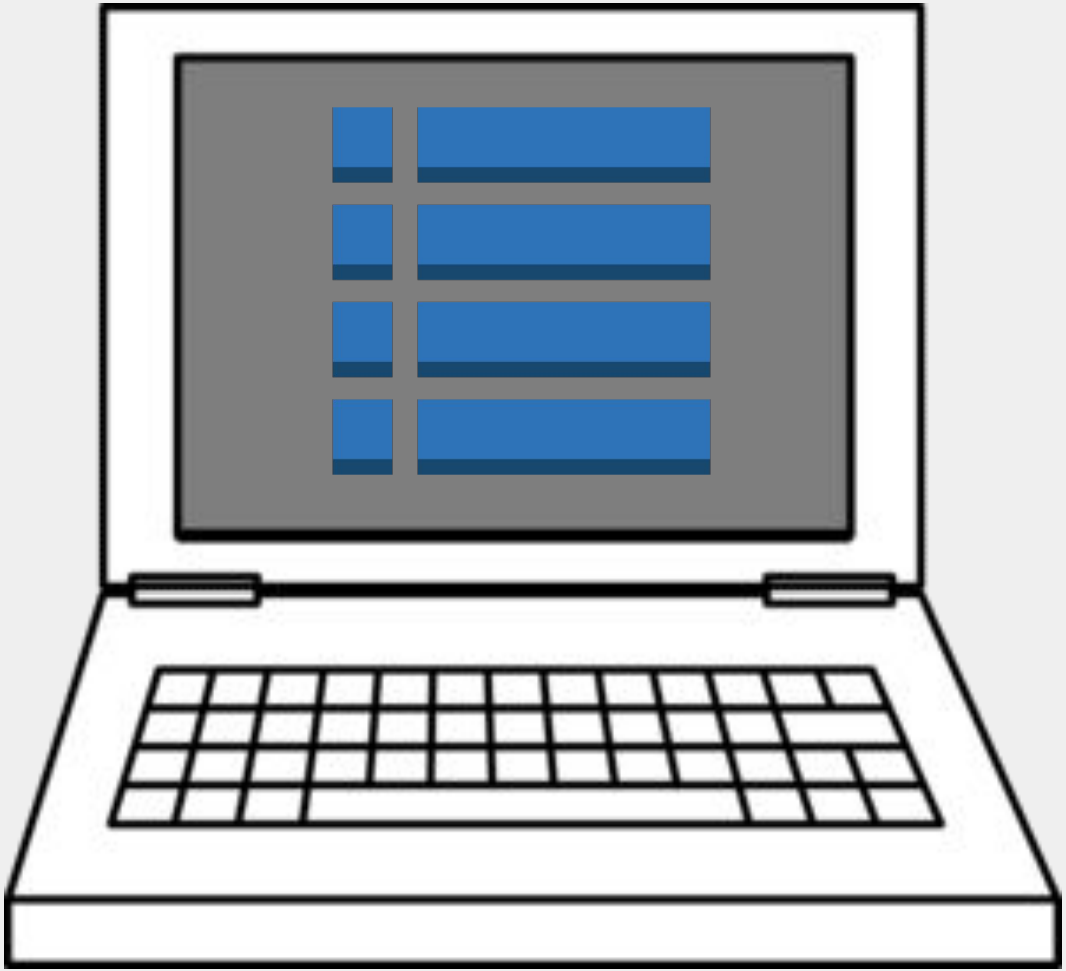
@CaseyRosenthal



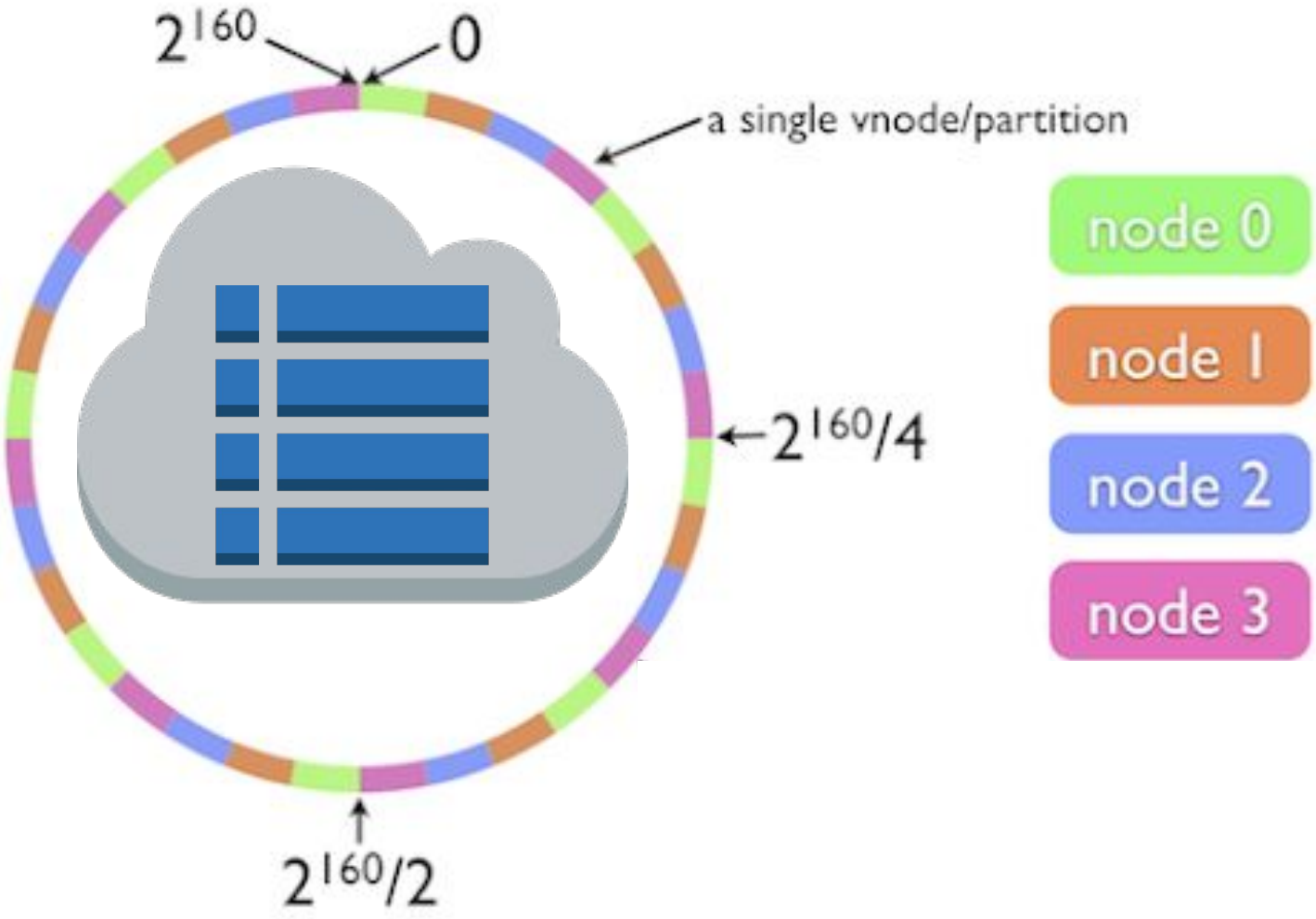
ACCIDENTAL

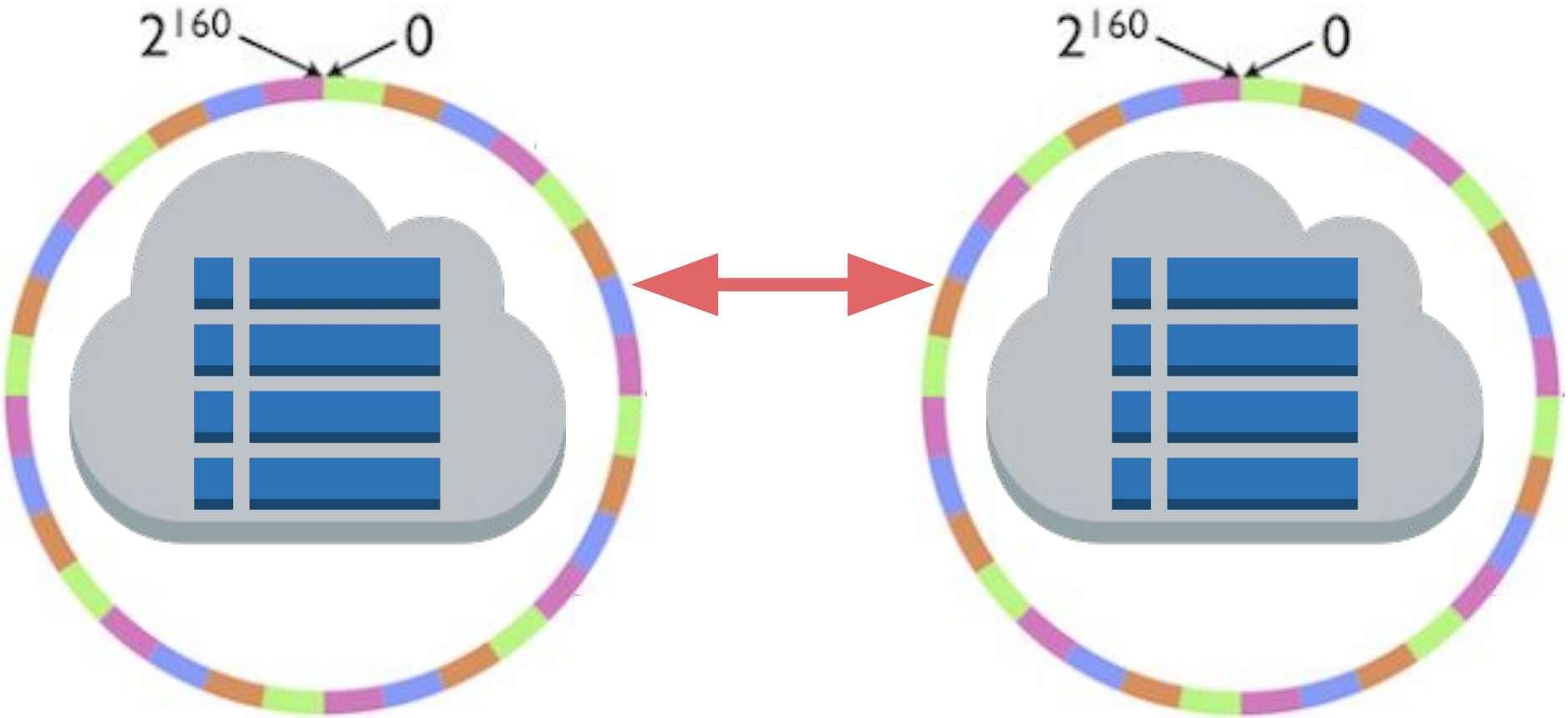
ESSENTIAL

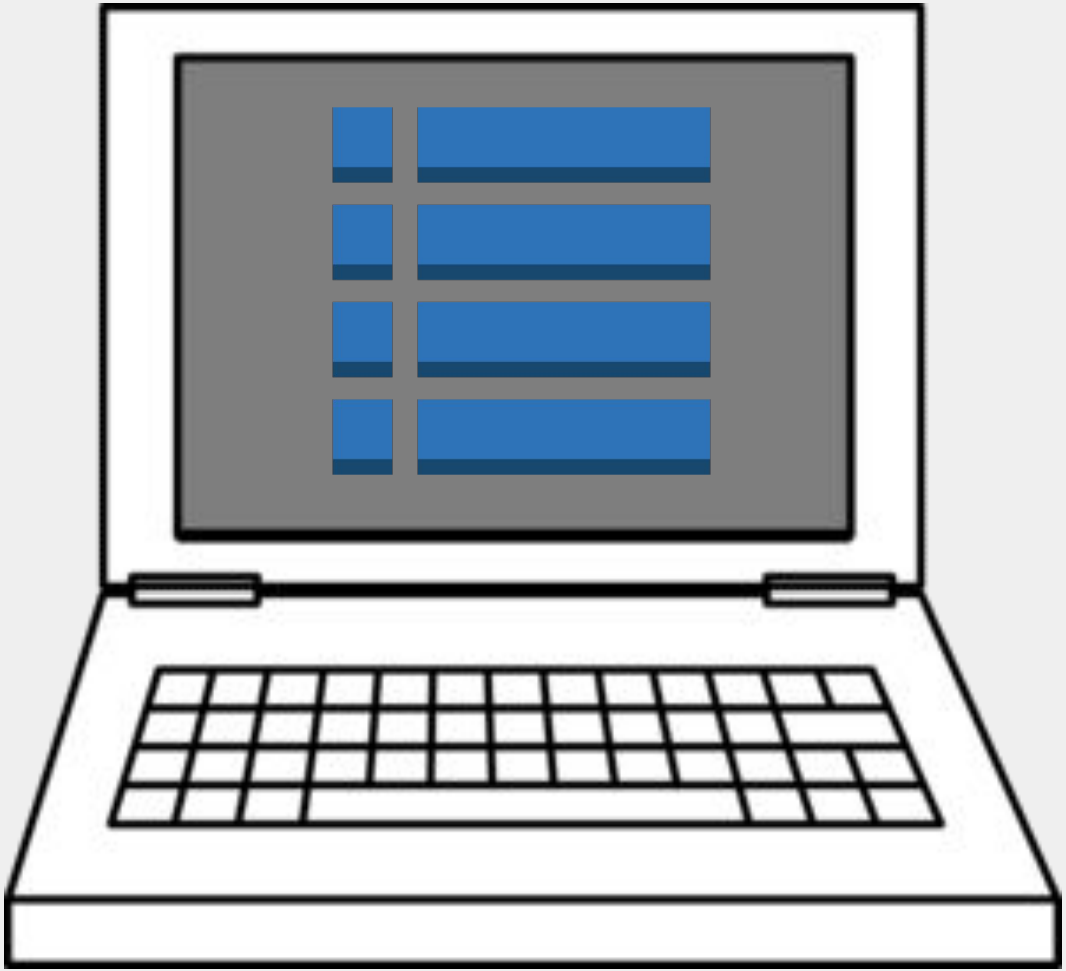







2^{160}
0
a single vnode/partition
$2^{160}/4$
$2^{160}/2$
node 0
node 1
node 2
node 3

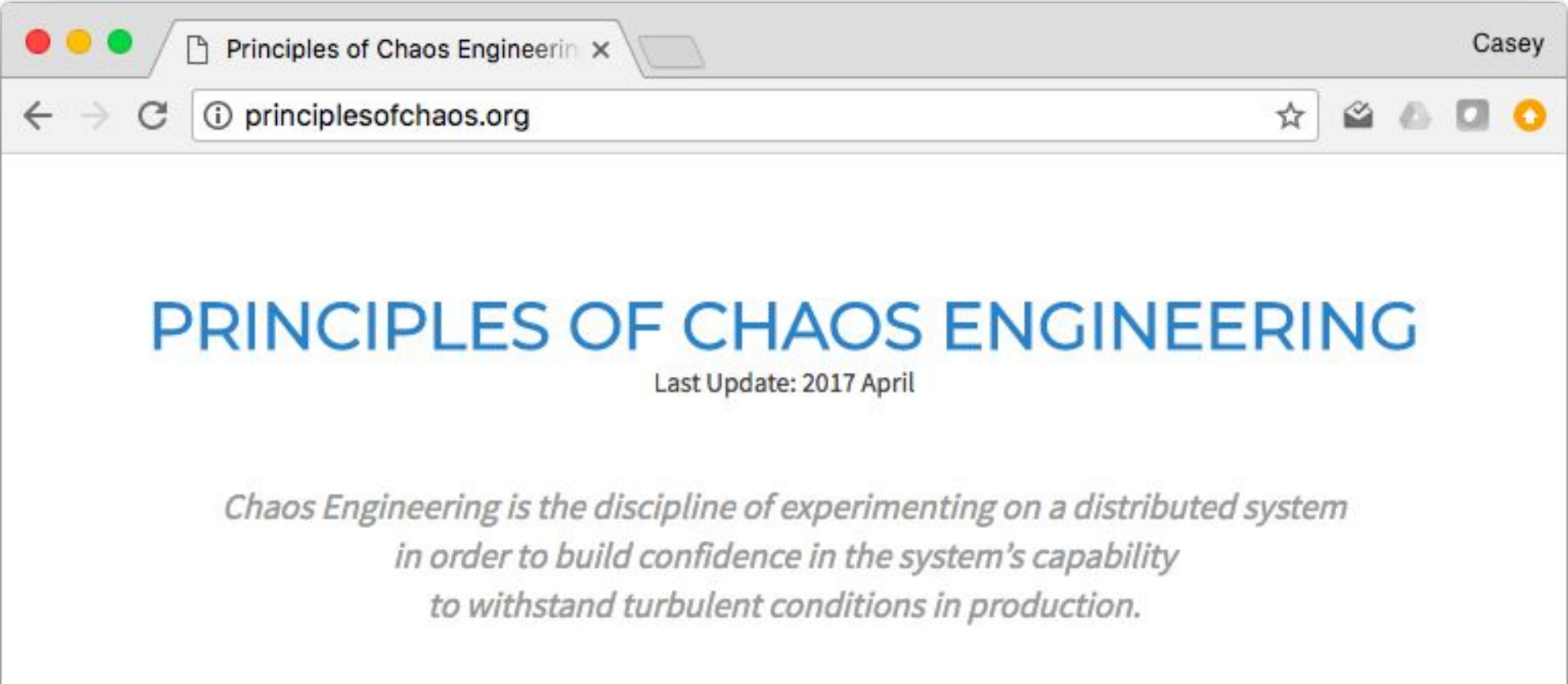

2^{160}
0
2^{160}
0

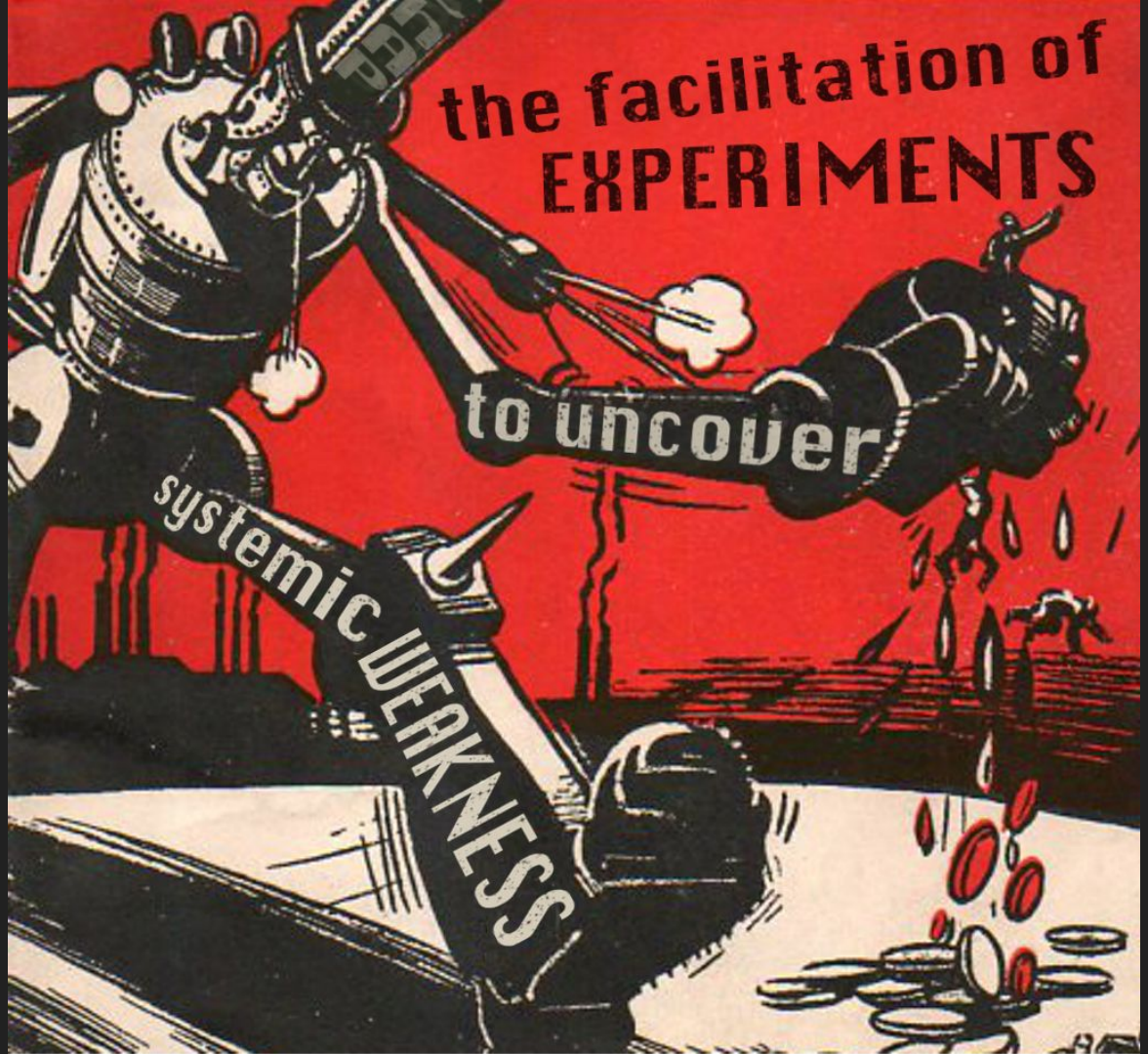


How do we
make systems reliable?

@CaseyRosenthal


ECONOMICS
WORKLOAD
SAFETY


Principles of Chaos Engineerin
Casey
principlesofchaos.org
PRINCIPLES OF CHAOS ENGINEERING
Last Update: 2017 April
Chaos Engineering is the discipline of experimenting on a distributed system
in order to build confidence in the system's capability
to withstand turbulent conditions in production.

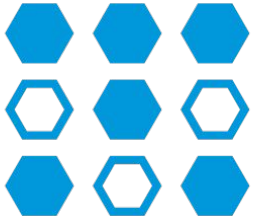

the facilitation of
EXPERIMENTS
to uncover
systemic WEAKNESS


ECONOMICS
WORKLOAD
SAFETY

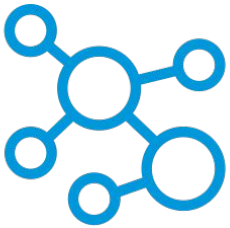
How do we
make systems reliable?

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Economic Pillars of Complexity



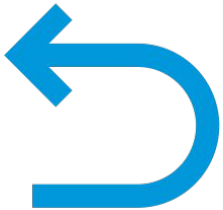
STATES



RELATIONSHIPS



ENVIRONMENT



REVERSIBILITY

@CaseyRosenthal

How do we
make systems reliable?

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“The chief merit of [software engineering] is its technical efficiency, with a premium placed on precision, speed, expert control, continuity, discretion, and optimal returns on input.”

-Merton

s/bureaucracy/software engineering/

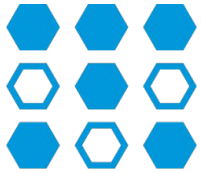
@CaseyRosenthal

“The chief merit of bureaucracy is its technical efficiency, with a premium placed on precision, speed, expert control, continuity, discretion, and optimal returns on input.”

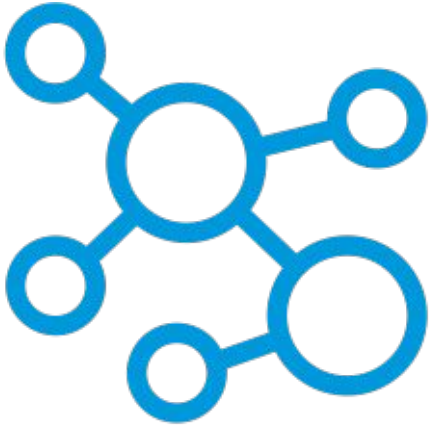
-Merton

Software Engineering: the Bureaucratic Profession

@CaseyRosenthal



STATES





WORKLOAD



SAFETY



ENVIRONMENT



AVAILABILITY

RELATIONSHIPS





REVERSIBILITY

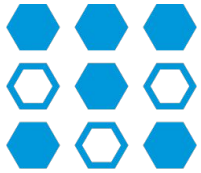


PERFORMANCE

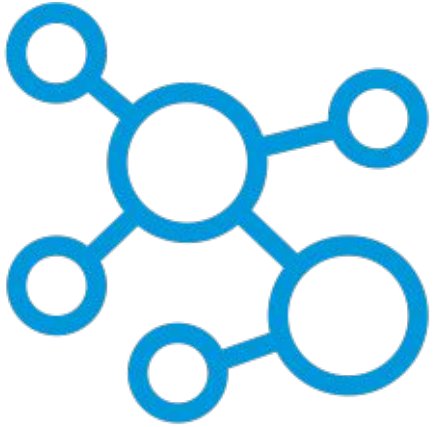


FAULT TOLERANCE

ECONOMICS



STATES





WORKLOAD





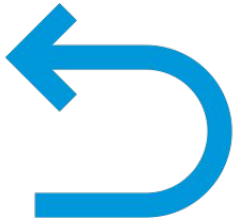
ENVIRONMENT



AVAILABILITY

SAFETY

RELATIONSHIPS





REVERSIBILITY

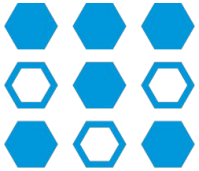


PERFORMANCE



FAULT TOLERANCE

ECONOMICS



STATES



AVAILABILITY



RELATIONSHIPS



PERFORMANCE



FAULT TOLERANCE



WORKLOAD



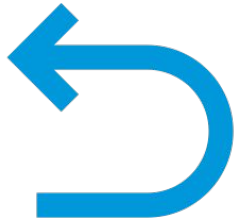
SAFETY



ENVIRONMENT



ECONOMICS



REVERSIBILITY

KMO:
Kitchen Model of Organization

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Think of a well-run kitchen.

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How do we
make systems reliable?

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- Embrace complexity and navigate it.

@CaseyRosenthal

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- Provide opportunities for teams to practice working together.

@CaseyRosenthal

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@CaseyRosenthal

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@CaseyRosenthal

- Embrace complexity and navigate it.
- Provide opportunities for teams to practice working together.
- Tolerate inefficiencies.
- Optimize for reversibility.
- Communicate the safety margin.

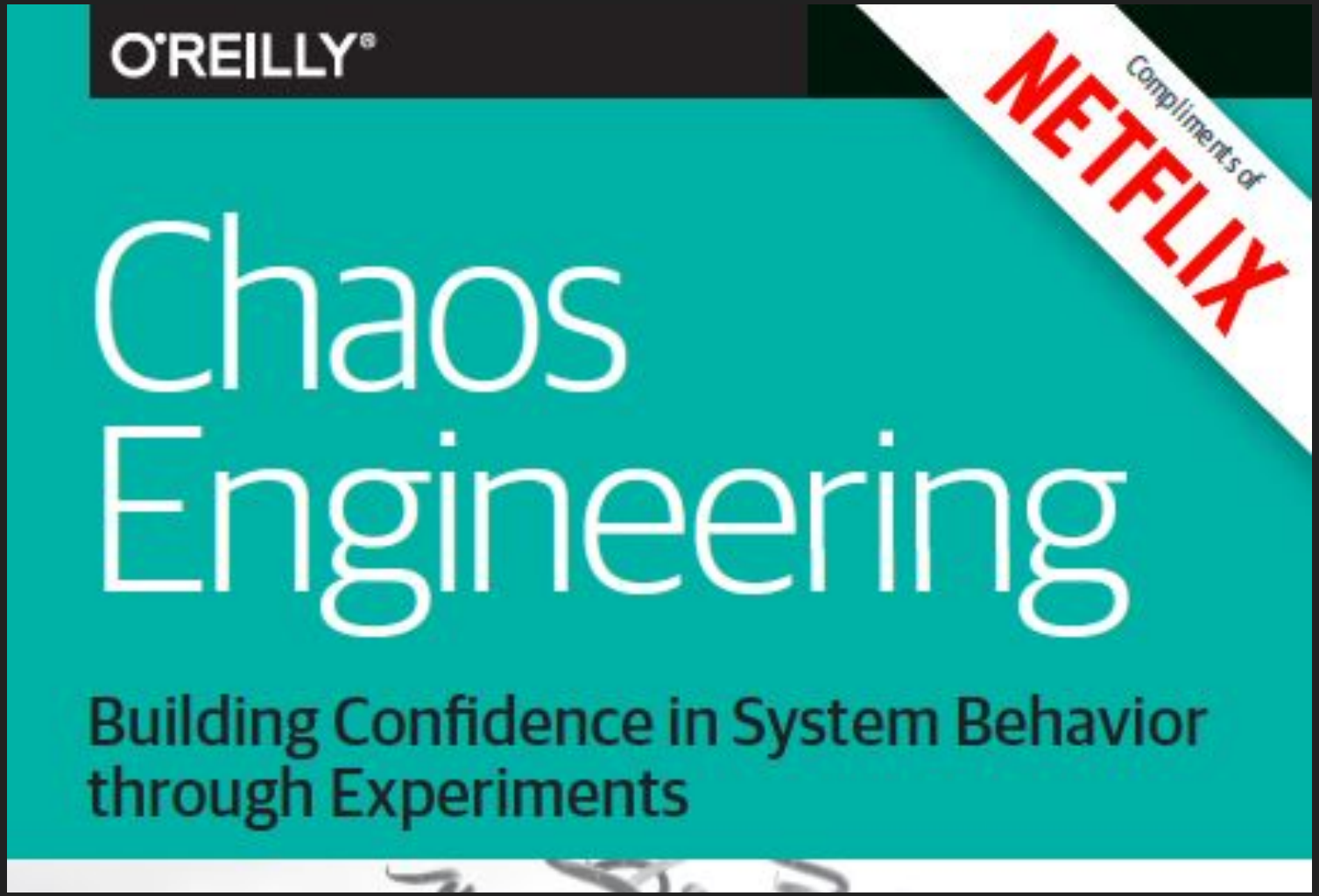
@CaseyRosenthal

Tools don’t create reliability.
Humans do.

@CaseyRosenthal

Tools don’t create reliability.
Humans do.
[But tools can help.]

@CaseyRosenthal


O'REILLY®
Compliments of
NETFLIX
Chaos Engineering
Building Confidence in System Behavior through Experiments



@caseyrosenthal