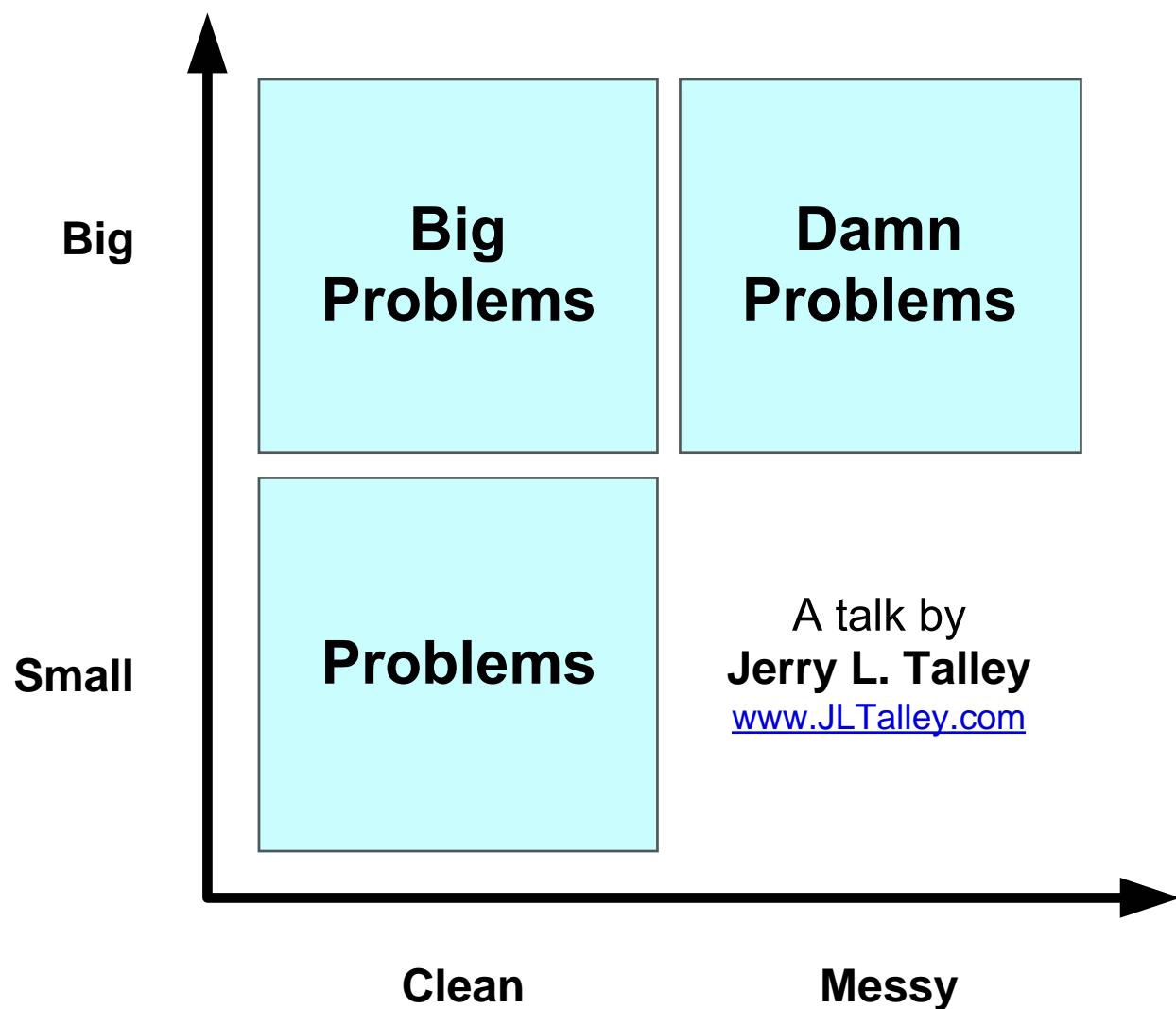


Problems, Big Problems, and Damn Problems <75>

Jerry L. Talley ~ Jerry@JLTalley.com ~ (650) 967-1444



A. Learning from the experts: Qantas

1. **P: Left inside main tire almost needs replacement.**
S: Almost replaced left inside main tire
2. **P: Target radar hums.**
S: Reprogrammed target radar with lyrics.
3. **P: Number 2 engine missing.**
S: Engine found on right wing after brief search
4. **P: Aircraft handles funny.**
S: Aircraft warned to straighten up and be serious.
5. **P: Something loose in the cockpit.**
S: Something tightened in the cockpit.
6. **P: Suspected crack in windshield.**
S: Suspect you're right.
7. **P: Test flight OK, except auto-land very rough.**
S: Auto-land not installed on this aircraft.

B. The Classic Model

1. **Solving a classic problem**
 - a. The problem was given
(in real life, just picking the right problem is half the battle).
 - b. The information provided was necessary and sufficient
(in real life, we seldom know if we have enough information, or which information is useful).
 - c. You couldn't negotiate with the terms of the problem
(in real life, there is *always* room to negotiate the terms of the situation).
 - d. Once the answer was announced, it was obvious to everyone
(in real life, the solution may be lost amidst political complexities and other priorities).
2. **The classic model of problem solving has been with us for almost 40 years, with surprisingly little modification.**
Despite its popularity, the classic model suffers from 3 deficiencies:
 - a. It is overly analytical
 - (1) Ignores interpersonal dynamics or politics
 - (2) Sometimes the "people issues" overwhelm the substantive issues
 - b. It ignores the organizational context for problem solving
 - (1) Departmental boundaries complicate communication.

- (2) The culture and politics of the organization can interfere with identifying problems or even force inappropriate solutions.
- c. **It presumes that problems are all of the same sort, amenable to the same strategy**

C. **Overview: Six Types of Problems**

Despite the seemingly infinite diversity, there are only 6 types of problems.
The most important part of problem solving is not "What's the solution?"; the most important part is "What type of problem are we facing?"

1. **The Types**

- a. Puzzles: engineering problems with objective criteria for solutions
- b. Too Rich: overwhelming number of options and only subjective criteria
- c. Uncertainties: numerous possible futures but an undeniable need for a present decision
- d. Disputes: legitimate competing interests requiring negotiation and compromise
- e. Dilemmas: simultaneous commitment to seemingly incompatible but essential goals
- f. Complexities: large, complex systems with their own momentum

2. **Why it matters**

- a. The TYPE identifies the most salient elements of the problem, the features you **must not ignore!**
- b. The TYPE defines a roadmap for how to approach the problem.
- c. The TYPE outlines the shape of the solution, so you'll know when you are done.

D. **Recognizing the Six Types**

1. **Puzzles**

- a. Building a commercial skyscraper
- b. Budgeting
- c. "Send a man to the Moon and bring him back safely"

2. **Too Rich**

- a. Design of your website
- b. What do you want Santa Clara to be like in 2050?
- c. Designing product appearance
- d. "Look and feel" of an architectural design

- e. Exploring future development trajectory for a robotic product
Could move into food prep, packaging, pick 'n pull, medical applications, manufacturing, radioactive environments, bomb disposal, etc.
- f. "Honey, let's remodel the kitchen!"

3. Uncertainties

- a. How many children will enroll in Santa Clara County kindergartens in 2020?
- b. Will we have a Republican or a Democratic president in the upcoming election?
- c. What funding levels can we rely on as California confronts its budget crisis?
- d. How will social media transform the political process in California?

4. Disputes

- a. Labor and management fight over salaries, benefits, and working conditions
- b. Environmentalists, developers, and local government struggle over siting of a new freeway
- c. Homeowners and cities fight over how much development to allow around Lake Tahoe

5. Dilemmas

- a. Low cost **and** high quality
- b. Projects **and** the portfolio
- c. Treatment **and** prevention
- d. Service delivery **and** product development
- e. Individual gain **and** maintaining collective resource
(individual nations struggle over farming fish or whales and possibly driving the species extinct)
- f. Rewarding the individual **and** Rewarding the team
- g. Centralized control **and** local customization
- h. Timely delivery **and** product quality
- i. Broad participation **and** decision speed
- j. Principled action **and** Politically viable programs (in public sector)
- k. Loan volume **and** portfolio safety (commercial banking)
- l. Quality of patient care **and** Affordable health care
- m. Performance **and** Development
(i.e., getting the best people on your team vs. taking on some interns)

- n. Having the passion of your convictions ***and*** Listening to the wisdom of the group
- o. Planning ahead ***and*** Responding on-the-fly
- p. "Is there, in all republics, this inherent and fatal weakness? Must a government, of necessity, be too strong for the liberties of its own people, or too weak to maintain its own existence"
--Abraham Lincoln, July 4, 1861

6. **Complexities**

- a. Finding scarce talent in national labor markets
- b. Increasing sales force *reduces* amount of sales?
- c. Reforming the health care system
- d. Pursuing overarching strategic consensus in a diverse, shifting community
- e. Navigating an economic recession
 - How bad will it be? When will it turn around? Will my segment lead or follow?
 - Would government intervention make matters better? Or worse?
- f. Improving a sour organizational culture
- g. Quarter-end spike in customer orders produces horrific workloads
- h. Using tax code to influence investment, savings, and spending
- i. The Arab Spring

E. **Most common typing errors**

A Classic Problem

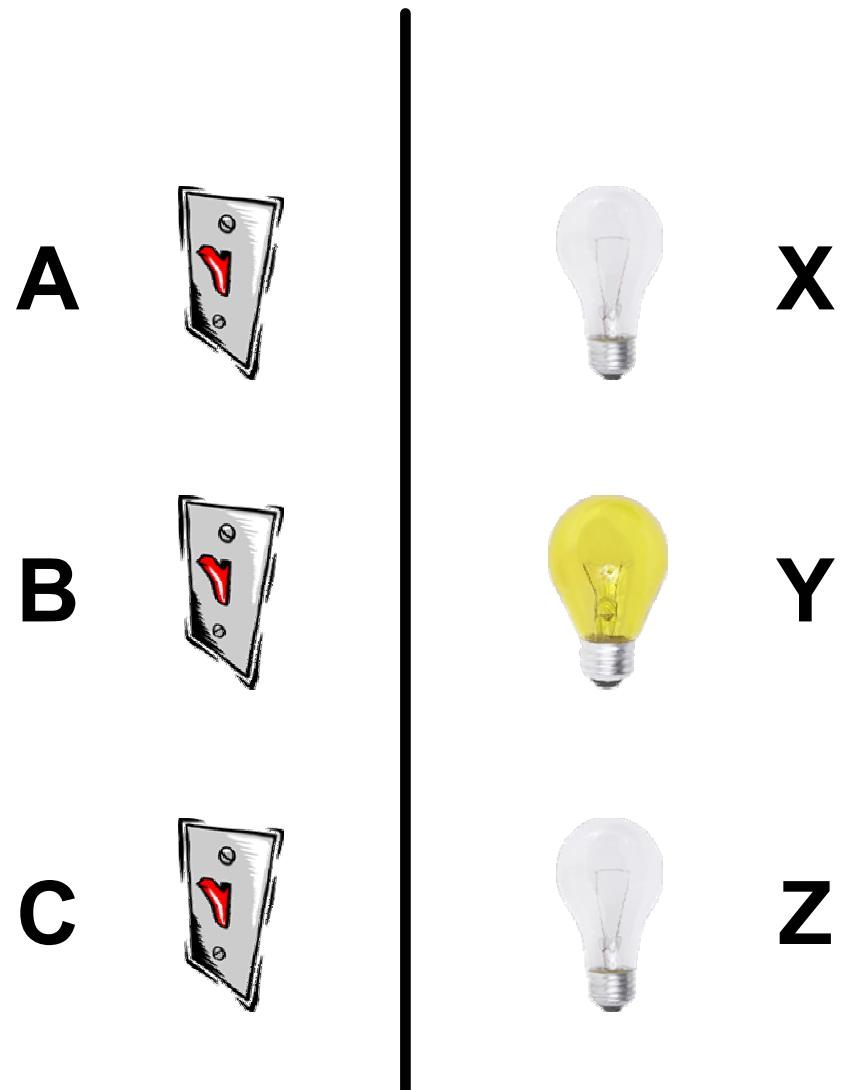
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You are in a room with 3 toggle switches: A, B, and C.

Each switch controls 1 of 3 incandescent bulbs in another room: X, Y, or Z

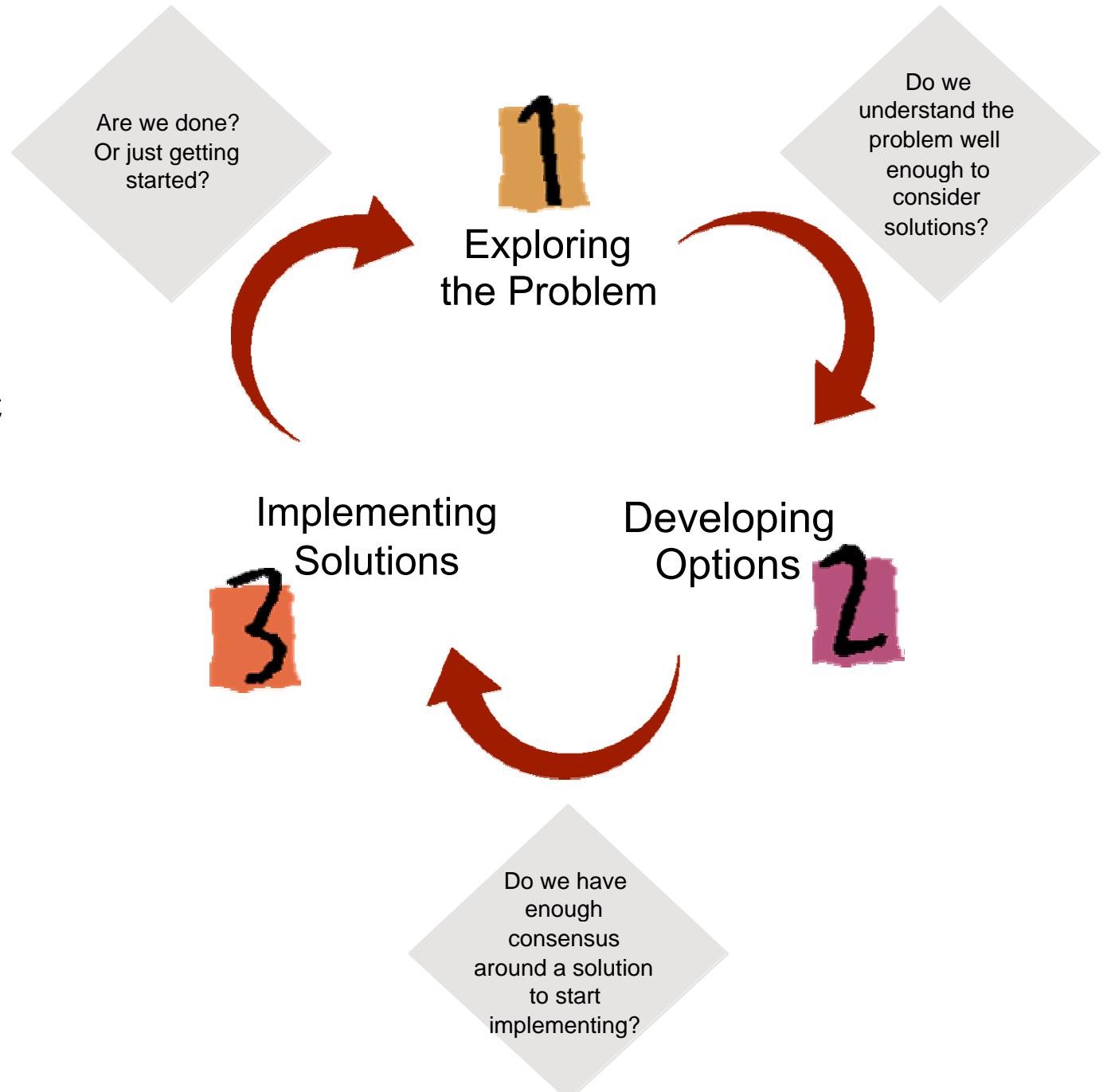
The lights are out of sight, and you can go into the other room only once to inspect the lights.

How do you find out which switch controls which light?



The Classic Model of Problem Solving

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Only 6 Types of Problems!

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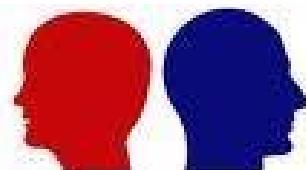
Puzzle



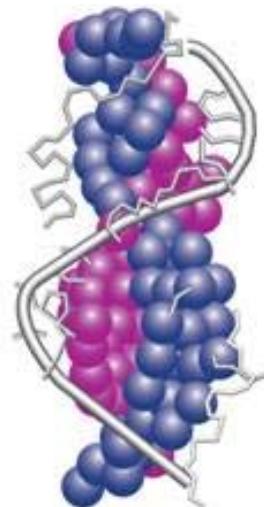
Too Rich



Uncertainties



Dispute



Complexity



Dilemma

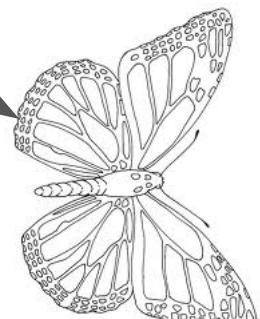
The
Problem
Type



What to
investigate
or explore



A roadmap for
resolution



Outline of the
solution



Puzzles:

Engineering problems with objective criteria and approved methods; requires expertise

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The Present

- Well bounded, contained, finite
- Variables mostly known ... or knowable
- Interdependencies are known; "we know how it works"

Likely Actions

- Tested methods for finding solutions
- Reusing a known solution is desirable when possible
- Clear relationship of parts to the whole allows you to decompose problem into smaller parts

The Future

- Validity of a solution is obvious once found, so the future is easy to anticipate
- Generally confident of a solution even before it's found



Problems that are Too Rich: Overwhelming possibilities with only subjective criteria for solutions; requires vision, courage and artistry

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The Present

- Vast number of options
- Present may not be particularly bad
- Subjective criteria
- There is an audience that has to believe in it, implement it, invest in it, buy it ... but can't see it.

Likely Actions

- Talk to customers
- Diving in...stepping back
- Creativity strategies
- More likely to be the work of a solitary actor rather than a group

The Future

- To be defined by the choices we make
- Likely to remain controversial



Uncertainties:

Present decisions depend on unknown future events; need to define and track multiple scenarios

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The Present

- Felt pressure to take action or make a decision TODAY!
- Deciding variables are unknown -- and unknowable -- until some distant future date

Likely Actions

- Define likely scenarios
- Look for commonalities
- Plan for each scenario separately
- Situation requires constant attention as future unfolds

The Future

- Uncontrollable, even if it is somewhat predictable
- May represent varying levels of uncertainty



Dilemma:

Simultaneous commitment to competing but essential goals; requires shift in mindset and radical collaboration

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The Present

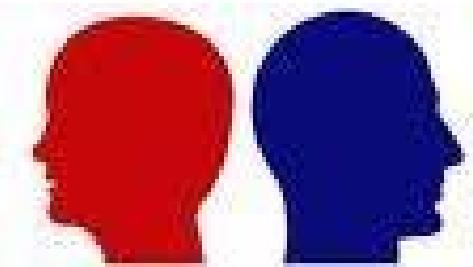
- An enduring tension
- If one side loses, all lose!
- Sometimes oscillate between extremes
- Often between departments
- Even good solutions prove temporary

Likely Actions

- Need a new mind set
- Build new relationships among players
- Instill orientation to continuous learning
- Capture the process more than the outcome

The Future

- Constant experimentation
- "Good solution" is a moving target



Dispute:

Conflicting interests of different parties;
requires safe forum for negotiated
settlement

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The Present

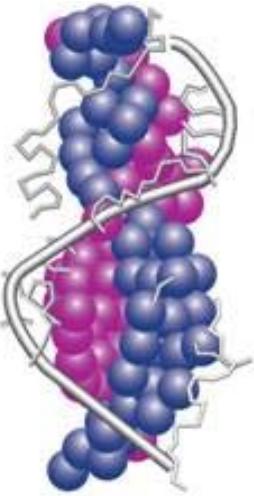
- Conflict or competition around common resource
- Players can't step away
- Not enough common interest to find agreement on their own
- Often represent enduring differences of perspective

Likely Actions

- Create a safe forum
- Encourage advocacy
- Install norms of reasonableness and fair play
- Political maneuvering of players can obscure critical information

The Future

- Compromise or settlement allocates the common resource
- Hopefully relationships are intact enough to support another conflict in the future
- There is some mechanism for enforcing the agreement



Complexity:

Large number of actors simultaneously reacting to each other; unclear boundaries, unusual causality.

Need humility and insight

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The Present

- Unpredictable and uncontrollable
- Unintended consequences often dominate
- Causal links are circular, reciprocal, delayed, obscure
- Any change is irrevokable
- Small, symbolic events are powerful

Likely Actions

- Humility
- Learn the system, but never completely
- Small steps, then watch
- Accept the reality of being *in* the system, not *outside* the system
- Attempts to make things better *always* make them different

The Future

- Always emerging
- Never under control
- Never fully understood
- Constrained by homeostasis of organic systems

Most Common Typing Errors

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