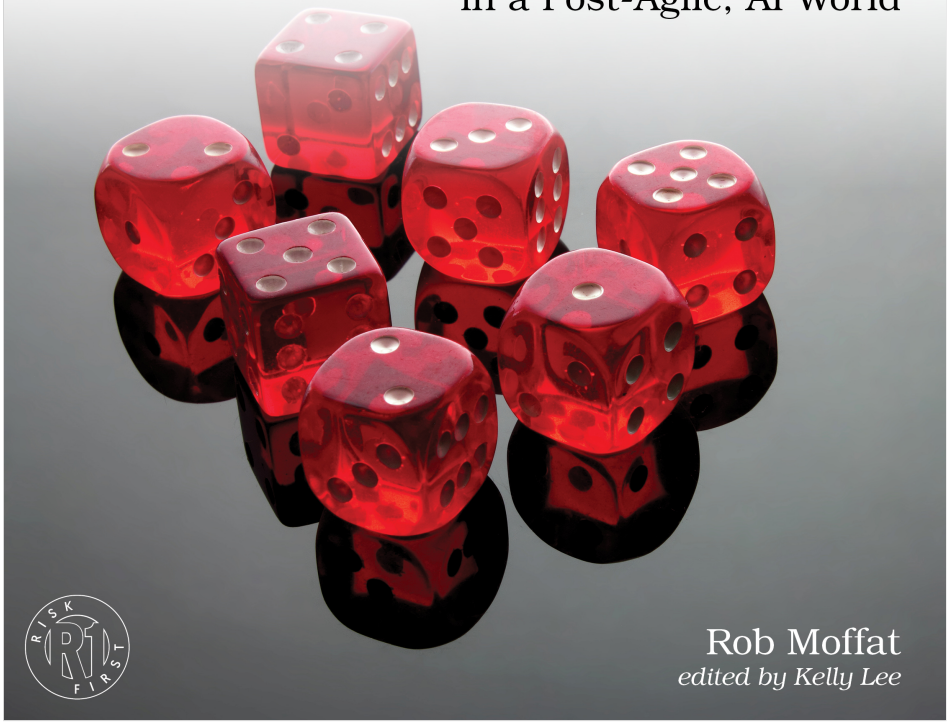
The Pragmatic Programmers

Risk-First Software Development

Second Edition

Deliver Better Systems in a Post-Agile, AI World



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CHAPTER 1

Living With Risk

Risk is everywhere. Perhaps without recognising it, we're thinking about risk all the time. From everyday choices to major life plans, we're constantly weighing up risk. Software development is no different: every decision involves trade-offs, and those decisions are shaped by risk — even if we're not consciously aware of it.

In this chapter, we'll dig into that idea and show how risk underpins even simple, day-to-day activities. We'll introduce new terms for thinking and talking about risk, and develop a diagrammatic way to express the often unconscious judgments we make about the risks we face.

For now, let's put software aside. Think instead about any everyday goal: passing a test, mowing the lawn, going on holiday. Each one carries some level of risk. For the purposes of this chapter, we'll use a simple, seemingly harmless example: organising a dinner party. It might sound straightforward but, as we'll see, there's plenty that can go wrong.

Having a Goal In Mind

Now, in this endeavour, we want to be successful. That is to say, we have a *Goal* in mind: we want our friends to go home satisfied after a decent meal and we want to spend time talking with them over the course of the party. To achieve our Goal we'll clearly have to prepare.

Since our goal only exists in our head, we can say it is part of our *Internal Model* of the world. That is, the model we have of reality. This model extends to *predicting what will happen*.

If we do nothing, our friends will turn up and maybe there's nothing in the house for them to eat. Or maybe, the thing that you're going to cook is going to take hours and they'll have to sit around and wait for you to cook it and

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they'll leave before it's ready. Maybe you'll be some ingredients short, or maybe you're not confident of the steps to prepare the meal and you're worried about messing it all up.

Attendant Risks: The Risks You Know About

These *nagging doubts* that are going through your head are the Attendant Risks: they're the ones that will occur to you as you start to think about what will happen.

When we go about preparing for this wonderful evening, we can choose to deal with these risks: shop for the ingredients in advance, prepare parts of the meal and maybe practice the cooking (as seen in the following figure).

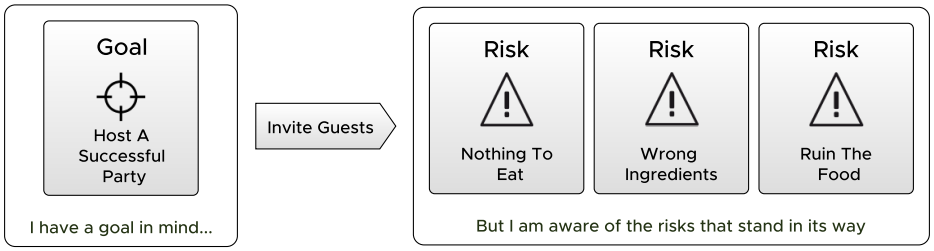

Figure 1.1: Goal, with some risks you know about

How much effort we expend on these Attendant Risks depends on how big we think they are. For example, if you know there's a 24-hour shop, you'll probably not worry too much about getting the ingredients well in advance (although, the shop could still be closed).

Hidden Risks: The Risks You Don't Know About

Attendant Risks are the ones in your Internal Model. You may not be able to exactly *quantify* them, but you know they exist. But there are also *Hidden Risks* that you *don't* know about: if you're poaching eggs for dinner, perhaps you didn't know that fresh eggs poach best? Donald Rumsfeld famously called these kinds of risks "Unknown Unknowns":

> "Reports that say that something hasn't happened are always interesting to me, because as we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns—the ones we don't know we don't know. And if one looks throughout the history of our country and other free countries, it is the latter category that tend to be the difficult ones."

> — Donald Rumsfeld, Secretary of Defense, Department of Defense News Briefing. February 12, 2002.

Different people evaluate risks differently and they're also aware of different risks. What is an Attendant Risk for one person is a Hidden Risk for another.

Which risks we know about depends on *knowledge* and *experience*: the strength of our *Internal Model*. This varies from person to person and team to team.

The following figure shows some examples of attendant and hidden risks for our dinner party. The top row shows some attendant risks — having the wrong ingredients, for example, is a *risk I know about*. The bottom row shows some Hidden Risks (annotated with a cloud symbol): old eggs not poaching is a *risk I don't know about*.

To give some more everyday examples, *exchange rate volatility* is an attendant risk of changing money before you go on holiday and *earthquakes* are an attendant risk of taking that holiday in Japan. Meanwhile, hidden risks turn attendant all the time: risks from *microplastics* are a good example of one that is moving out of the shadows and into the public consciousness at the time of writing.

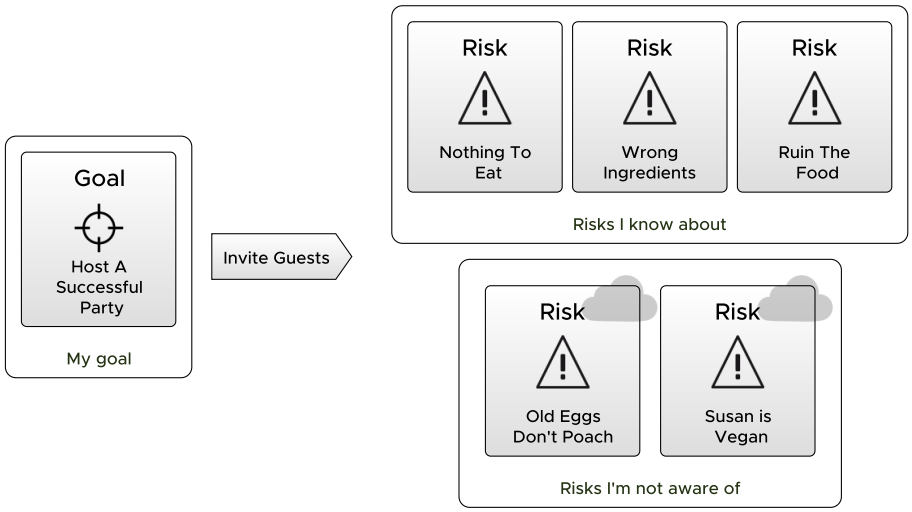

Figure 1.2: Goal, the risks you know about and the ones you don't

Deconstructing Risk-First Diagrams

As you've already seen, we've made use of diagrams to visualise the risks we faced and the choices we were making. These are called "Risk-First Diagrams". Let's look at what is going on in these diagrams so that when we come to apply them to *software development*, they're not totally confusing.

Figure 1.1 on page 4 represented the idea of wanting to host a successful party and understanding that there are Attendant Risks in doing this. The following figure introduces the idea of dealing with the risk of not having enough food at the party by buying lots of snacks beforehand.

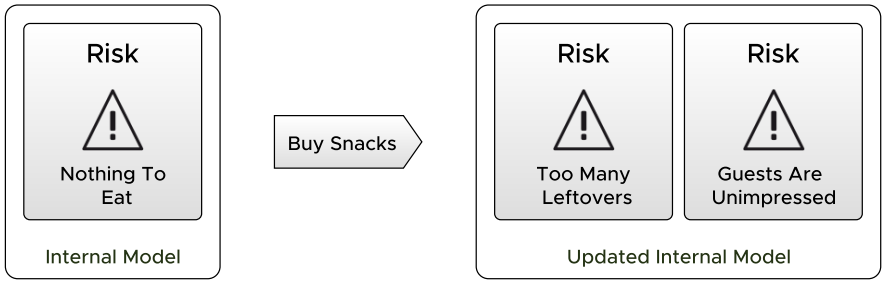

Figure 1.3: Nothing to eat

What's going on in these diagrams? How should we interpret them? Let's work left-to-right through them.

On The Left: The Starting State

The left side of risk diagrams represents a starting state: that is, the profile of the risks you're exposed to before you try to take action and do something about them.

In the diagrams we've seen so far, we've had the Goal of "Hosting a Successful Party" and the risk of "Nothing To Eat". The following figure shows these again. "Hosting a Successful Party" is a goal we'd like to reach, whilst the risk of having "Nothing to Eat" is something we'd like to avoid.

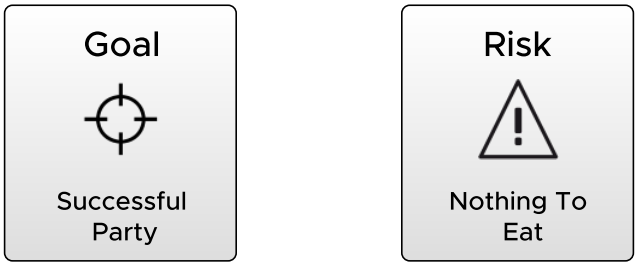

Figure 1.4: A goal to reach and a risk to avoid

But to achieve this goal or avoid this risk, we're going to need to take some actions.

In The Middle: Taking Action!

In the middle of a Risk-First diagram, we see the actions you could take to try to reduce those risks on the left. The following figure, compiled from the earlier examples, shows "Hosting a Party" and "Buying Snacks". One moves us towards the goal of "A Successful Party" and the other moves us away from the risk of "Not Enough Food".

Figure 1.5: Taking Action

Taking Action occurs when we try to *do something* about a risk. When that happens, our Internal Model is forced to Meet Reality — that is, doing something to change the risks we're faced with. By interacting with the world we add knowledge to our Internal Model about what works and what doesn't and maybe we reveal some Hidden Risks in the process.

Even something as passive as *checking the shop opening times* is an action, and it improves on our Internal Model of the world.

Taking Action to deal with risk *changes* reality: hopefully, you're materially affecting the world in your favour but you could also end up making things worse. If we had a good Internal Model and took the right actions, we should see positive outcomes. If we failed to manage the risks, or took inappropriate actions, we'll probably see negative outcomes.

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