All.Net Analyst Report and Newsletter

Welcome to our Analyst Report and Newsletter

Users simply cannot get it right all the time

I am probably as heavy a user of computers lifetime as anyone you are likely to encounter. Last month I sent out 3870 individual email messages – more than 100 per day. And I took a week off! I often get up at 5AM or earlier and use computers on and off till I go to bed 16 hours later. I have been doing this more or less since the early 1970s (not that many emails a month since then, but other computer-related activities). I am also an expert in computer security, develop software, use software mechanisms I know much of the internals of, have a Ph.D. in a related field, and study these issues all the time. And yet:

I continue to make "rookie mistakes"

Twice in the last 2 months I have sent a reply-all instead of reply, in both cases to the same email list, in both cases from my cell phone, in both cases while waiting in a dentist office.

- It's not the fault of the dentist office (although that is a weird coincidence).
- It's not the fault of the cell phone (although the interface does not make it obvious).
- It's not the fault of the email client (although it keeps changing settings without notice).
- It's not the fault of the mailing list software (although it has many confusing settings).

The fault is in me. The human being.

I am imperfect

It seems that no matter how I may try to re-code myself, I am incapable of doing my job perfectly. I haven't given up on it, but I have long ago come to the conclusion that it is not going to happen. I blame myself for my imperfections. However:

So are you

I had an uncle who used to respond to the "nobody's perfect" claim with "speak for yourself".

That was one of his many imperfections. He may have been joking, but it didn't quite come off that way. If you think you're perfect, it's just because you haven't figured out that the thought itself is a mistake.

It's not the user's fault

If you are not perfect and I am not perfect and none of us are perfect, blaming us for our imperfections will never solve the problem. In fact, we will never solve the cyber-security problems we have, because the problems are unsolvable. They are not solvable because we seem to be putting forth the wrong problems.

Aiming at the wrong targets

I have seen many cases where people keep pursuing the wrong thing and are frustrated by their inability to achieve it. In computers, we seem to seek perfection and I think that's the wrong target. There's a saying "perfect its the enemy of good enough". But this, while it may be true, also fails to address the question of what is good enough?

Digital systems are brittle

There's an old saying:

To err is human… To really foul things up it takes a computer.

It is inherent in the nature of digital systems that they are brittle. This is true at the level of the physics of digital information, and it is reflected at all levels above. That's because digital systems are discontinuous and divergent. A single bit flip can, and often does, cause a completely different outcome. These outcomes sometimes get amplified so that a small difference in finger position combined with the excessive precision of the digital display and packing of too many icons in too small an interface, combined with an interface they call intuitive but keeps changing and takes a long time to learn, combined with a lack of amplification warnings, combined with at least 5 different settings that effect the outcome, can cause 15,000+ emails to be sent instead of 1. Twice in a 60 day period from one person.

There's a tradeoff between efficiency and effectiveness

So why is it my fault? Because it's my choice. I have chosen a tradeoff between efficiency and effectiveness that led to two such errors in 6 days. And I chose not to go through and verify the 5 or more settings in different systems the first time it happened because I imagined I could not make the same mistake twice.

I have now made those setting changes which I imagine will prevent me from making that mistake again in the near term. But I would bet it will not work for long. The reason is that it makes me less efficient, and I will end up making more mistakes of not sending reply-all to other messages when I should because I changed the settings, and have to spend more time correcting those errors, even if they are smaller in their apparent negative effects.

If I could change the user interface on the email client of my cell phone, I could allow reply and reply-all to both be options at the same interface point, but then I would end up pressing the wrong one more often anyway. And since they would be more packed in, it would be more likely to make more small mistakes that would add up to possible larger overall mistakes. OR I could get a phone with a larger interface, but then it would not fit in my pocket, and …

How does this effect better design?

Here's the real issue. We (the computer interface community) suck at design. We do not have a clue about how to design systems to compensate for human imperfection, and especially at the level of activity that humans are expected to interact with computers.

When I say we, I include myself because I design software with interfaces that some people thing are terrible, and I create Web pages that folks claim look like they are from the teletype era. I know a little about why I do things the way I do them, but I don't have a clue about how to create an interface that properly trades off efficiency for effectiveness from a cyber-security perspective, taking into account the consequences of mistakes and the brittleness of systems.

Conclusions

My reply-all it not as bad as a gas explosion. But the death of 1,000 cuts comes from too many small errors combined. It's not the user's fault, but it is the designer's fault, and more to the point, the fault of the field of design not fusing with the field of cyber-security. If we are to alleviate the brittleness of cyber-systems, we will have to work together.

