



MCTTP 2025, Keynote

**From InfoSec to building
products and back
or
What is worth working on**

Enno Rey, ERNW, erey@ernw.de

Good morning and welcome to the 2nd day of MCTTP in lovely Munich,

It's an honor to speak to you today. My name is Enno Rey and I've been doing security work for quite a while now.

[Personal Intro]

Networking guy in the 90s

Founded, in 2001, one of the coolest and longest-existing vendor-independent security companies in Europe (ERNW), plus another one in 2015 (ERNW Research), and a conference in 2008 (TROOPERS) Did some research, gave a couple of talks, in the review board of a few conferences, contributed to some books

Being an early Internet person, and having a background in networking, I had a passion for IPv6
=> Apple

Since MCTTP is an event with a strong international audience Florian, Marc, and Florian kindly suggested that, instead of giving a keynote on security topics, I provide a little intro to German culture and literature. Ok, just kidding, I *will* actually reflect on cybersecurity, in particular on different types of people and activities which can commonly be found in the space, but I will also include a little tour thru an opus which many consider to be Germany's greatest piece of literature, and which might teach you a bit about cultural elements of this country. You'll get some exposure to certain, let's say: colorful parts of Germany's culture on Saturday during the visit of the Oktoberfest, but it might not hurt to get some nuance to the impressions that you'll take from there ;-)

When you ask people from the field of German literature, or you ask your favorite chatbot, which is the country's most important book, it might happen you get this one as a response.

[NIBELUNGENLIED]

Indeed the Nibelungenlied is a fascinating piece of – medieval – literature, with a lot of fascinating, and still unresolved, research questions. Unfortunately, the last 2000 lines are pretty much all about slaughter and bloodshed, and in the end all main characters are dead, so this might neither be a good entry point to German culture, nor to reflections on cyber security.

There is a fair chance anyway that the response to the question on Germany's most important book refers to this one:

[FAUST, person]

For the Non-Germans in the room, anybody has an idea who is this guy?

Correct, that's Faust. There was a historical figure with that name in the 16th century, but more importantly Faust is the protagonist of one of the great German writer Goethe's major pieces. Strictly speaking it's two books: "Faust Part 1", and "Faust Part 2", which were published with lag of 24 years, the 2nd part only posthumously, but we can neglect that for our discourse today.

Some of you might already spotted the word "Tragedy" in the title, but we'll ignore that too, since I want to speak about cybersecurity, which of course is far from being a tragedy ;-)

So what's the story of Faust? The elements that are well-known in popular culture can be grouped around three themes:

A bet between that guy Faust and an devilish entity called Mephisto.

A romance between Faust and a lady called Margarete, or "Gretchen".

Another bet between The Lord and said Mephisto.

Let's dive into the 1st book of Goethe's adaption. After three preliminary parts, which we skip for the moment but one of them will play a role later, we see Faust in his study, alone, at night.

[NACHT]

There he is, desperately looking for some (intellectual) breakthrough moment, and I guess many folks here in the room can relate with that setting of loneliness and desperation while the world around you is sleeping and you're researching some vulnerability or try to come up with a working exploit.

The breakthrough moment Faust is looking for is this one

"Was die Welt im Innersten zusammenhält"

So he's on a pursuit of enlightenment which also is a strong motivator for many security people. I can state myself that my early steps in the security space were heavily driven by curiosity and by the feeling that looking at some technology from a hacking angle revealed things that one might have missed when just glancing at the way how the thing was supposed to work from a functional perspective.

Let's keep that motive of curiosity as a motivator for security work in mind for a second.

Faust then tries a number of things to foster that breakthrough. He invokes a supernatural being called the "Erdgeist" which disappears after some exchange, without Faust having advanced wrt his quest, and at some point Faust is willing to drink some magic potion that, as of common interpretation, could kill him.

Alas none of those attempts really help him progress, despite his willingness to sacrifice.

He's saved from his suicidal ideas by heavenly sounds from the outside, in the context of the Easter festival going on. These make him leave the house and talk a walk – some of the Germans here in the room might have heard of the famous "Osterspaziergang", it's this exact scene – after which he returns home, still looking for that breakthrough moment. At this point he even starts reading the Bible – I'm not sure how many security researchers happen to do that these days ;-) – but then eventually something happens,

There's a poodle that has been following Faust for some time, and it turns out to be that devilish creature Mephisto, disguised as an animal.

[POODLE]

Once more, for the Germans in the room: ever heard of the expression: "Das ist des Pudels Kern"? Here we are. For the non-German crowd: you may use this one, the "Pudels Kern" for situations where the real nature of something is revealed in a surprise way. Maybe at Oktoberfest you'll have some moments of that type.

Mephisto subsequently introduces himself as

"Ein Teil von jener Kraft,
Die stets das Böse will und stets das Gute schafft."

Which is an interesting definition from many angles, namely

- He describes himself as being a *part*, so as something which is not complete by itself, and
- as somebody spending efforts in a one direction which in turn lead to an outcome in another direction.

Again, let's keep these in mind for a moment.

It turns out that this Mephisto has all sorts of capabilities, which among others allow him to leave Faust's house which is protected by a pentagram. The way he does this is pure classic hacker stuff: He tricks the defender (of his home, by means of the pentagram), that is Faust, into some activity (sleeping), then invokes a little helper (a rat) to perform some cracking of the protection (the rat gnaws one angle of the pentagram) which in turn had a little flaw (say a misconfiguration) from the beginning, and finally he escapes by circumventing the security control (the pentagram).

Still Mephisto returns to Faust shortly thereafter, and this leads to the part which is well known in popular culture as "die Wette", the bet between Faust and the devil.

Mephisto offers Faust to bring him to a certain state of piece of mind characterized by no longer searching for sth, and in exchange he wants Faust soul after his death. This is presumably the origin of the expression "to sell one's soul". Let's have closer look here.

Here's the promise of reaching some goals, in exchange for selling your soul to an entity which has lots of resources including all types of "Zaubertricks"/shenanigans. This is a situation which sec researchers might know:

Techniques to do all sorts of things, distraction and shenanigans in exchange for, well, some foundational element of their existence like their soul, or their values.

We now have two main protagonists, one on an ongoing quest to expand his knowledge (and to reach a subsequent state of piece of mind, as of the bet), the other one helping the former with all sorts of little tricks.

In short: what we see may be a researcher and a breaker.

Faust and Mephisto then jointly set out to explore the world, and they come to a place called "Hexenküche", "the witch's kitchen" where Faust gets some magic drink creating, well, a certain type of desire in his body.

The next stage of interest for us is them encountering a young lady called Margarete / "Gretchen". Faust and Gretchen are attracted to each other – after that magic potion which Faust received at the "Hexenküche" he might actually be attracted by any women – but it's poor Gretchen that is the first to meet him, and they'll start a relationship very soon.

This, their relationship, is the second main part of the story in popular culture.

Before Gretchen eventually falls for Faust, she asks him a crucial question:

[Gretchenfrage]

International crowd, please note: a question so existential that some important future course of action depends on the response in Germany is often called the "Gretchen-Frage".

That's the general concept.

Interestingly Faust avoids to give a clear response, and he really weasels around the answer. One might say: he acts in a way that some men happen come up with when they have a specific, very one-sided interest during an encounter with a woman.

We should also note that there is a number of secondary activities happening around Faust and Gretchen. In order to foster that relationship Mephisto provides all sorts of shortcuts. He supplies some jewelry, he sedates Gretchen's mother so Faust and she can meet at night and her mother eventually dies from that, and later helps Faust to kill Gretchen's brother.

Faust is quietly and inherently ok with all these things happening. We could say the (re-) searcher accepts the shortcuts that the breaker sells. Shortcuts that – here – even kill people.

Things don't take a good turn for Gretchen, she finally ends up in a dungeon, condemned to death for having killed her baby from the relationship with Faust. Faust shows up in the dungeon and tries to convince her to flee with him, which she refuses. With that ends the 1st book.

[Kaiserliche Pfalz]

Early in the 2nd book, Faust and Mephisto re-unite at the court of the realm's emperor where Mephisto has taken a role as jester and provides soundbites and services of all types. His main service clearly being that, in order to solve the emperor's financial worries, he creates a new type of money whose value is based not on tangible assets but on somewhat unclear future rewards, on promises. Does that sound familiar? Non-tangible money whose value is solely based on promises coming out of the sphere of breakers ...

Overall the 2nd book is a very complex opus. Hence I only pick selected pieces for my storyline here, and I simplify a lot. The main development of interest for us being that at some point Faust undergoes a transformation. From researcher he turns into a builder.

He reclaims land from the sea, similar to projects that the Dutch performed in the 19th century, he oversees construction work, he performs trade and other activities. He's no longer on his quest for knowledge, but has moved into a builder existence.

When you build things they may last. Some don't, but some do.

On the contrary a vulnerability that you find, by definition, doesn't last. And an exploit that you develop or use might give you some temporary satisfaction – I get that, I've been there – but it's still temporary.

On the other hand artifacts of builders may last a long time.

When I look back to my years as the IPv6 program lead at Apple I can certainly state I was only small contributor to the many IPv6 efforts happening at the time.

At this point a special Shout-out to Jason, Matt, and Nick for being my fellow argonauts on our IPv6 journey, and to Jane & Dan for being my managers & mentors. I was part of a larger community of builders.

The thing is that the elements we worked on are still alive, and will continue to be so for at least a while. Every time I use my iPhone to access Apple services from a German mobile operator network like Deutsche Telekom – and German operator networks pretty much all have IPv6 these days – there's a fair chance that the vast majority of traffic happens over IPv6, and I might actually have contributed a very little piece to that.

That's what I mean when I say that artifacts of builders last.

Back to Faust: I earlier mentioned that there are three main themes one of which we haven't covered so far. We spoke about the bet between Faust and Mephisto, and we spoke about the Gretchen story. We haven't spoken about the bet between The Lord and Mephisto yet. Before the real story – remember the scene with Faust in his study at night – starts, there's a gathering of the Lord and Mephisto called "Prolog im Himmel", the "Prologue in Heaven". In that scene the Lord and Mephisto have a little exchange in which they debate the nature of humanity. They conclude with an informal bet where The Lord allows Mephisto to try to seduce Faust, considered here as a sample of a human who – while committing errors here+there, is still overall on the right track – to deviate from that path.

In this scene the Lord states the following

Des Menschen Tätigkeit kann allzu leicht erschaffen,
[...]
Der reizt und wirkt und muß als Teufel schaffen.

And here it becomes clear that Mephisto, the breaker, has a role in a larger plan of The Lord.

Why is this important? Recall the self-characterization of Mephisto when he introduced himself to Faust?

”Ein Teil von jener Kraft,
Die stets das Böse will und stets das Gute schafft.“

That mirrors the exact concept which is already introduced at this, earlier, point.

It also reveals that – contrary to a line of thinking where the builder and the breaker, defense and offense, are equal players, at least in Goethe’s Faust they are not. Here, in the Prolog im Himmel it’s explained that the role of the breaker is to prevent humans, builders from becoming complacent. Hence the breaker, or more generally speaking offense, is just a stimulator of mankind, or a contributor to a greater cause. But **not** an equal partner to the builder.

This reflects my own understanding of the relationship between defense and offense, where the latter is a necessary part of a larger lifecycle of building things.

While in was in Apple’s offensive security group in Paris, from September 2023 to February 2025, I was working with some of smartest researchers on the planet (a quick shout-out to all members of then Team LLL, to Pietro and Enrico, to ”le catho“, and to quite a few others – you know who you are) but I was somewhat struggling with my role in that universe. Having been in a group working on a real feature, the Emergency SOS over satellite service, earlier during my career at Apple, I missed the builder aspect while I was n Paris. I could certainly intellectualize that we folks doing security assessments of Apple’s core components performed security quality control, and hence made the product more secure and better, but it never felt like building stuff in the 1st place.

This imbalance between offense and building stuff is also the reason why in Goethe’s Faust Mephisto might not even be able to win one of the bets, not the one he has with Faust nor the one he has with the Lord, since a bet only makes sense between equal partners.

And that, the structural, inherent inability to win the bet manifests at the end of Faust. After Faust dies, having claimed that he’s on the verge of perfect happiness, his soul is taken, one could say: rescued by some angels. while Mephisto is distracted and subsequently remains with a bitter taste of feeling betrayed.

Still from a certain perspective he was never supposed to be able to win the bet at all.

What’s the moral here? Simple: it might be more worthwhile to be like Faust, to be a searcher and a builder. Being on the side of shenanigans, shortcuts, vulnerabilities and exploits might look appealing, but you’ll ever only be an contributor to some other, greater cause. You may not feel the real deal.

Thank you for giving me the opportunity to share some details of my journey, and to – hopefully – educate you a bit on one of the greatest pieces of German literature. I wish everybody a fantastic day at MCTTP.

These are the two cool security companies providing specialist security assessments and incident response respectively:

<https://ernw.de/>

<https://ernw-research.de/>

And this is the conference I mentioned:

<https://troopers.de/>

