

The Open Source Way

Episode 07 - OpenUI5 – A One-Stop-Shop UI Toolkit



Karsten Hohage: Welcome to The Open Source Way. This is SAP's podcast series in which we'll talk about the difference that open source can make. In each episode we'll talk to a different expert and we'll talk to them about why they do it the open source way. And this time around, it's probably Happy New Year because if everything goes right, this is going to be our first episode in 2021. And in this first episode of 2021, I will be talking to Andreas Kunz and Peter Muessig about OpenUI5. We will learn what OpenUI5 is, how it relates to other SAP UI technologies like, for instance, SAP Fiori, why we run UI5 open source, or at least partly, and what there is to learn from that project. A quick introduction to our two guests today. Andreas Kunz is with SAP since 2005 and with UI5 from the very beginning in various roles, now as a lead architect. He's always eager to engage with the outside community and he's an advocate for openness and open source in general. Peter Muessig or for the English-speaking world, Peter, is with SAP since 2005 as well. He is an initial member of the Phoenix Project, also known or later known as UI5, OpenUI5, SAPUI5, grown into the role of the chief development architect for UI5 by now, and today mainly focuses on the evolution of the framework, the controls and the tooling to move things closer to general web standards. Let's maybe start with a little bit of an explanation, Andreas. What is OpenUI5 or maybe what is UI5 and then what is open about it?

Andreas Kunz: Yeah, UI5 is a web UI framework, so it's the UI elements you see on the screen as a user like the buttons for input fields or calendars or whatever you have there. But it's also the framework below. So it's the data binding. The data model is how it speaks to the back end and it's the application structure, the model view controller concept, translation, all kinds of framework functionality. So that's the core of UI5. And the controls that I mentioned are bundled in libraries, in control libraries around that. So it's a bunch of control libraries, about a dozen or so in OpenUI5 and, yeah, as you said, UI5 is an open source library, or an open source framework, which we have put in GitHub in, I think, 2013. So it's an open source project for a long time already.

Karsten Hohage: OK, and we have now heard about UI5, many people out there may know SAP Fiori as a SAP's UI technology. How do UI5 and Fiori relate to each other?

Andreas Kunz: Fiori from the beginning was more the design concept for a new set of applications that are a more user-friendly and not so overloaded with lots of stuff on the screen and the user doesn't find his or her way. So Fiori is really more a design concept

or the visual design. This doesn't prevent some people from talking about "Well, I'm using Fiori", when they actually mean the technology behind it - which is UI5. And I mean, we have talked about OpenUI5 so far. There's also SAPUI5, which might also be something that is confusing to people. So why is there OpenUI5 and SAPUI5? What's the difference? So as I said, OpenUI5 is the core framework functionality plus a bunch of control libraries around that. And when a customer buys some SAP product and gets SAPUI5 with it, then that's the same thing. It's OpenUI5, it's the same bits and pieces. It's exactly the same code, plus some more. So in SAPUI5 you get some more control libraries. The core is the same. A lot of libraries are the same. But in SAPUI5, you just get like 10 or 20 more control libraries on top that you don't have in OpenUI5.

Karsten Hohage: Which are then often specific to certain SAP applications or how comes that?

Andreas Kunz: Exactly, yeah, so that's often the case that applications have very specific requirements that are not really suitable for a general UI framework, or where we just cannot promise that we can implement the stuff and UI5 is extensible so they can just implement the controls like we can. And this is why other teams then decide to develop it on their own but also contribute it to SAPUI5 in a more InnerSource way. So it's not open source, it's not developed outside, not available for free for others outside but still, it's a sort of contribution to the overall SAPUI5 project.

Karsten Hohage: So basically, the overall picture is we have the same core and one time it's extended with InnerSource mechanisms and one time it's extended with open source mechanisms, basically.

Andreas Kunz: Yeah, so, I mean, everything that is on GitHub, OpenUI5 is on GitHub, everything that has contributed there also automatically becomes part of SAPUI5, as I said, the OpenUI5 part is one-to-one equal also in SAPUI5.

Karsten Hohage: OK, cool. And that's mostly on the control layer or is it, like, can you say there are different layers? You talked about data bindings and so on, would that also be something with open source contributions or is it more on the UI control side?

Andreas Kunz: When you talk about the contributions that's happening, I think, across the board, it's happening more on a single-patch level. I would say it's not like people out there decide to create their own control and provide it to OpenUI5. It's more bug fixes and so on and smaller features. We do have an external repository for contributions also, for development of open source controls that are not going to be in OpenUI5. But that's not becoming part of the framework. That's in the community out there.

Karsten Hohage: OK, so, Peter, maybe turning to you now with something like UI platform, like UI5, thinking of Angular and other approaches like that, it may seem obvious that one goes open source with that but UI5 hasn't always been. Why and how did it become open source?

Peter Muessig: Once in the beginning, when we started development of this client-side framework in 2009, we really started with thinking of doing it the open source way. This wasn't really possible at that point of time because SAP mainly focused on developing this stuff internally. But all of a sudden, there was more or less an announcement at TechEd at the end of 2013 which somehow stated that we should open source the core of SAPUI5 as OpenUI5. And this was, I think, the starting point when we really got into work. So Andreas, me and others in the team at that point of time, we really had to sort out what we needed to do and can do to make this core of open, of the SAPUI5 project available as open source. And this really was some kind of key starting point when we got out there.

Karsten Hohage: OK, but did it directly go open source or was there an InnerSource phase in between more or less?

Peter Muessig: Definitely so, and Andreas mentioned that part already. So we started around 2011 internally, already thinking about including these parts from other teams, custom controls which we don't develop in the core framework to put them in our delivery, in our SAPUI5 delivery and to share it and also with their project for sure, and also with other projects which may also need that one. One example of all that initial contribution was the inbox control we had or we have in the SAPUI5 distribution which was then some kind of a first guinea pig to try out how InnerSource can work.

Karsten Hohage: When you said this was one of the earliest contributions, does that belong to the core now or is that still part of some list of extensions or something?

Peter Muessig: UI5 is built in a modular way, so we have this core part of UI5 being the framework. We have in the framework things like our data binding, the control framework and stuff like that. But the controls are not part of the core itself. It's more that for every control we provide, we have some kind of UI libraries. In these UI libraries, we bundle more or less our UI controls and share them then with our developers. So when this team came to us, the inbox team and they asked to really share their own control with others, we said: "We already have this mechanism inside the framework with these UI libraries that we can provide, include and provide their control in a separate part in this in this UI library". And then this UI library is becoming part of our distribution. So we have to imagine it's somehow bundling UI libraries. And with that, we can then distribute it to the others.

Karsten Hohage: When you said it's built modular, I think it's not even always about, how would I want to call, it being user-delivered coding. A lot is also about tooling, about test routines and so on where people contribute, right?

Peter Muessig: Yeah, true, so in the beginning, it was more that we looked into the framework and the control parts, nowadays we are opening up all the things a bit more that we are also building tooling, we are building, testing stuff around, and all the things are more developed in separate repositories, separate libraries. But this is something which is still not part of that, what we have in our core delivery. As we said, so the core delivery is more the framework, then we have the UI controls around and the testing and the tooling is something we develop separately.

Karsten Hohage: OK, I understood the part about the control libraries but what I was more getting at is, except for control libraries, there's also other stuff that's partly being contributed also, like tools around UI5, test frameworks or scripts or whatever. Isn't that right?

Peter Muessig: When we started in the beginning with developing or sharing this OpenUI5 repository with the outside world, which are mainly the source codes for the libraries and the controls in the framework part, we also started to provide the tooling.

So we developed this Grunt-based tooling and then we had invested in testing frameworks, shared it to also with the community. And with that we also got our active involvement here in the topics from the community which also enhanced the tooling and our testing frameworks out there. And also, with the things happening right now around this UI5 evolution project, we are modernizing our framework. We are now starting new projects, the UI5 tooling project, which is the successor of the Grunt-based or the web components, UI5 web components. They are now really built as real open source project from scratch; not like we have with OpenUI5 where we started first in-house. And besides that, there is much, more. We have a Chrome plugin, in the meantime, TypeScript generation and so on and much more around that is happening in the community. And this is also interesting. That community also has its own initiatives now. There is the UI5 Lab, where additional libraries are being developed and controls and there is, for example, also the tooling ecosystem where the community provides extensions to UI5 and it's quite nice to see this community interaction getting more and more active.

Karsten Hohage: So when you say "by the community", these things like the UI5 tooling ecosystem, for instance, they are actually driven by community members from outside of SAP really, truly or purely open source, basically.

Peter Muessig: Yeah, that's true. So this is something we started, for example. The UI5 tooling ecosystem was really a project that started at the UI5con in 2019 where one of the community members really approached me at the conference and asked: "Let's get this kind of a little project started where we showcase that the tooling can be extended with additional things", because he asked for a proxy at that point of time. And I said: "Yeah, build it yourself". And by sitting together one afternoon, Fridays, we created this project and shared it as an open source GitHub project where now also many others contribute their own extensions to the tooling, and it increases more and more now. And so this is really prospering this project.

Karsten Hohage: Sounds cool, sounds like a pretty active community as well. Maybe back turning back to you, Andreas. Is that generally the case in your long-year experience with the project?

Andreas Kunz: Yeah, I would say so. So, I mean, Peter has given some great concrete examples and generally I would say the community is happening on several levels. So one thing is the code contributions when somebody really implements features and contributes it somewhere or works with us on a tool or so, as Peter said. But there's other means of community collaboration. I mean, they are of course, the bug reports on GitHub. So when people report a bug that's not providing code, but it's still providing value to UI5, right? And the bug reports, I'm not sure, I think we got like 2000 bug reports so far and they generally have a very high value. So people are really eager. I mean, it's publicly visible. They are eager to present their bug reports in a good way with solid description, with a high quality, with examples and so on and this is really helpful. So 50 percent of the bug reports really lead to a fix in UI5. That's a pretty good rate. And there's more: people are writing blogs about UI5, they are trying to integrate UI5 with other tools and so on, providing plugins to editors which make working with UI5 easier or more fun. And that's all providing value to UI5 without a real code contribution to our delivery. If you're, on the other hand, also engaged with the community. So we do podcasts - like this one - or other ones about technical topics. Now, in Covid-19 days, we do Zoom conferences for the community to have some live interaction, we have a YouTube channel, the UI5con that Peter mentioned. So there's a lot going on from both sides, basically.

Karsten Hohage: Is it, can we, like, put any numbers - do we have any places where we can count individual users or whatever who are in some way involved with OpenUI5?

Andreas Kunz: I mean, it's hard to get the usage numbers because people don't have to register themselves to use UI5 but the UI5con conference, for example, that used to be an in-person conference and was fully booked in St. Leon-Roth with 400 something people. And those places were gone in like two weeks in the first year. They were gone in one day in the second year, in the third year it was in half an hour and all places were gone. So there is very eager interest. That's only 400 people, of course, limited by the room size. I'm not sure how many would have come in the past year, actually, in 2020 we had UI5con online with more than a thousand participants. And when we look at something that is more long-term available, that's the openSAP course that we offer about UI5. The first one has now 80,000 enrolled learners. There seems to be a quite big community of people that are somehow interested in UI5.

Karsten Hohage: Something like the course seems to be a pretty good indicator, the number of people who at least have an interest. While you talked before, I was there at some point thinking something. Now we do have InnerSource activities and we do have open source activities. Does it happen that someone, on an inner-SAP way, doesn't get what they want and then they contribute it on the open side?

Peter Muessig: In some places, this really can happen. Yeah, it depends on where, maybe we have seen that more in places like the tooling parts or so where it's pretty easy to write an extension on that. You can then, if you don't get the parts that you need for your tooling internally, that you contribute them as kind of an open source project externally. I also had some students in the past where we talked about how to provide the progressive web app enabler for UI5 applications. And then I said, well, it might be hard to get that in as a standard tooling plugin for UI5, for the UI5 tooling. But what we can do easily is to create an open source contribution for that in this ecosystem. And that's how it has been made available there out there. On the other hand, for controls and stuff like that, it may be a bit harder, let's say. And there with the InnerSource concept you already have quite good capabilities to make it available in your own layer if you don't get it in a central layer.

Andreas Kunz: But if you don't want to distribute it to the entire world, if you just need it on your own, then I mean UI5 is extensible so you don't need to put it into UI5 delivery to get it yourself to use it, right?

Peter Muessig: That's true.

Karsten Hohage: OK. Yeah, I was just wondering because there are these two sides basically from which you could contribute, maybe that was a stupid question.

Peter Muessig: No, no. Why not? Because you have several layers, so you can say if it makes sense to share it with everyone and it's somehow generically usable, it makes sense to put it in the OpenUI5 framework and then really go to OpenUI5 on GitHub and then raise the issue or create a pull request for that. We discussed it. If it has such generic purpose, we can really get that in. If not, we may ask you to then do it more on

another layer, be it InnerSource, be it open source or be it on your own line. You can do it then depending on what kind of purpose it is.

Karsten Hohage: But at least the part of my question where I was assuming that sometimes also SAP employees contribute on the open source side is probably correct, right? It's not always just: "OK, I'll stay on the InnerSource side because I'm SAP".

Peter Muessig: You have guys like this and you have guys like that, some developers are a bit shy. I remember especially in the beginning when we did this open sourcing of UI5, where some of the developers really asked: "Ah, my email address then gets public on GitHub and everyone can contact me. Is this really ok?".

Karsten Hohage: Well, I mean, is that shy or is that data protection, data-privacy-aware? I know a lot of colleagues who do online banking only after they've booted Linux from a stick. So I think that's maybe not shyness, but more that kind of thinking. Right?

Andreas Kunz: I mean, it might be related to data privacy but I don't think they really see the email address, at least who can hide that. But you are somehow identifiable by name and you are connected to the code you submit on GitHub. And that was a concern for some that, like everybody in the world, can, in theory, observe exactly what you are coding and see the quality of your code and so on. And that was a concern for some in the beginning. But I don't think it's a lot of a concern now.

Karsten Hohage: So were they, like, kind of more concerned about sharing their IP, or were they more concerned about writing ugly code and being mobbed for it?

Andreas Kunz: Not exactly that it is really ugly code but they were concerned that everybody could see what they are working and writing and maybe they feared being criticized or being told that: "Well, the code you wrote yesterday, I just saw it on GitHub, and that's not so good. I would have done it differently". That was a concern for some, for few. But I don't think it's a concern anymore now.

Karsten Hohage: I guess that's rather not a concern, but the whole point, isn't it?

Andreas Kunz: Yeah, and it also helps people to focus more on what they are doing and on delivering better code, more documentation and so on.

Karsten Hohage: And isn't it like the point also of open source initiatives that quality management is basically being done by the entire community, right?

Peter Muessig: That's true, yeah, we get a lot of bug reports also from the community.

Karsten Hohage: You mentioned that before.

Peter Muessig: Andreas said it, yeah, that's true. And this leads more often to a bug report than internal reports, issue reports because most often, these guys, they are sitting there and doing analysis or pre-analysis in detail. So let's say the quality of these GitHub issues are most often higher, right, Andreas?

Andreas Kunz: But what I just said for the code, for our people developing, writing code for UI5, that they are afraid that everybody sees what they are doing. That's, of course, also the case for GitHub issues. When somebody reports a bug, then he doesn't want to feel ashamed that it's a bad bug report or that people say: "Hey, you just didn't understand it". So they make really sure that it's well-described and so on.

Karsten Hohage: This also gets me to a question, speaking of people being shy about putting their code out there, speaking of the community, who does the quality management and so on. In the end, UI5 is an SAP project, right? Why do people get involved or how do you get people to get involved? And also, how tied is UI5 actually to SAP solutions or is it completely free to be used on top of whatever?

Peter Muessig: So basically, it's free to be used on top of everything else as well. So OpenUI5 is available under the Apache license and so you can use that. But as, I think, Andreas mentioned it initially, we have parts in the SAPUI5 distribution which are related to SAP platforms, having maybe also a connection to a backend also. And this requires then also to run this part then on an SAP system. So a lot of interactions, I would say, they are really coming from people which are involved with SAP and they have some need and that's why they're contribute to SAPUI5 at the end. But these parts, we ship really in the OpenUI5 way, they are really, let's say, independent. For

sure, there is still some stuff inside where we have kind of a strategy like the OData protocol, it's also SAP. And not only SAP, it's done together with Microsoft the standard and used but we decided to use this kind of protocol to connect to our backends because it provides some more information from the backend. But it doesn't mean that in the end, we are tightly coupled to that. Many people also misunderstand this part really. So you can really also build your own data connection against REST backends or what I showed at the UI5con this year, how to use Apollo GraphQL to connect with UI5 frontends against an Apollo GraphQL middleware or backend part.

Karsten Hohage: So, meaning it doesn't even, like, when usually we talk about it, we say, OK, you can do open data or you can do plain REST, and now you're saying it doesn't even need to be REST, right?

Peter Muessig: Yeah.

Karsten Hohage: OK, so totally open.

Peter Muessig: Exactly, and it's more a question on how far you want to go with going in, understanding the framework, implementing your own kind of data connectivity layer, like that's what you can do with this GraphQL as well.

Karsten Hohage: OK, and you have like any very prominent or totally crazy or whatever interesting examples where people have gone without all too much SAP connection and worked with UI5.

Peter Muessig: Yeah, one funny part was really two years back in 2018 after the UI5con that year, people from CERN – so this is the nuclear research center in Switzerland – they reached out to me. I got an email which was written mainly in ASCII charts and I was wondering whether this is some kind of spam mail or not. But after the second mail or third mail came, then I was really interested in the content and then I really read it carefully and I really saw then CERN. So and I said, wow, wow, these guys are interested in OpenUI5 and they invited me to a conference, to their ROOT conference. It's a ROOT workshop which takes place in Europe and different locations. And then the researchers are meeting there to discuss the next steps on this ROOT framework. And they invited me to present OpenUI5 because they were really

interested in OpenUI5 for its qualities. And compared to other open source frameworks, UI5 has one important quality for them which is the long-term support. So you have to imagine in ROOT, in CERN, they are developing software for the next 20 years and they also want to have support for a UI framework for the next 20 years. And with OpenUI5, they see that this is possible because SAP stands behind that and we do that for SAPUI5 and thus, indirectly we do that also for OpenUI5. And this was really impressive for them. And that's how this connection then was made. Also today, they are still continuing to develop their UI frontends with OpenUI5.

Karsten Hohage: Wow, sounds cool. Andreas, any other, like, on totally the other end of the world, maybe examples where UI5 is being used?

Andreas Kunz: As I said, I mean, people don't have to register themselves with us to develop some app but sometimes we, incidentally, get to know some projects that were built with UI5 because it appears somewhere in the website of the project or on the App Store. So in the Google Play store and I think also the Apple web store we found some interesting things like, for example, the educational apps for children from.. I'm not sure exactly, where it was written, do you remember Peter?

Peter Muessig: Was it in the US somewhere?

Andreas Kunz: Africa somewhere, India also. So it's something very colorful for children, for education or somebody has developed a home automation app with UI5. So that's all kinds of things. As always with open source, people use it for whatever they are interested in and build something that's it.

Karsten Hohage: And that's more like single players than basically, I assume, right? Not large commercial or scientific, like CERN, organization behind that, right?

Andreas Kunz: Yeah, in those cases, it was really, I guess, single developers.

Peter Muessig: But, Andreas, remember at the UI5con we had, I think it was in 2019, there was this one challenge "Who builds the best OpenUI5-based app" and then there was at the end of the UI5con this round and it was pretty impressive what these guys did. And one of the examples was one home automation thing, I remember that

because of this solar energy metering there, this was pretty impressive. But there is more.

Karsten Hohage: Any cover versions of Space Invaders or something, no?

Peter Muessig: Pac-Man.

Andreas Kunz: One of the early projects or one of the early apps we developed inside our team was really Pac-Man developed with UI5, with the original algorithms of Pac-Man and the Ghost and so on.

Peter Muessig: If you find a "codewarrior" on GitHub, then you know who did that.

Karsten Hohage: That's the username?

Peter Muessig: He doesn't like to be mentioned with his normal name.

Karsten Hohage: Oh, OK, the "codewarrior". So, everyone go look for the code warrior and find out his real name. No!

Peter Muessig: With an O.

Karsten Hohage: "codewarrior"?

Peter Muessig: Yeah.

Karsten Hohage: OK.

Peter Muessig: He's always worrying.

Karsten Hohage: I understand. OK, speaking of all these things, speaking of home automation apps and CERN and everything, how can people get involved and find more information about OpenUI5?

Andreas Kunz: Well, I guess the main entry point would be openUI5.org. That's the main web page of the OpenUI5 open source project. And from there, you can find all kinds of pointers to different channels, to interactive courses, to GitHub. We have a slack for OpenUI5, I think there are thousands of people registered. You can find links to the podcast, the openSAP course I have mentioned. So basically, all communication channels you will find on the community page on openUI5.org.

Peter Muessig: openUI5.org and community, there is a specific entry on top.

Karsten Hohage: OK, and maybe then as a totally, no we'll see, but I assume final question. What are the, except for the points where more information can be found, what are your two to three main messages that you want people to take away from this?

Peter Muessig: Now, OpenUI5 is really one of the early projects, which did it the open source way. So we started, as we have heard, in 2013 with that. And this was, I think, the second project from SAP. This makes us also a bit proud. So the first one was, I think, was the Memory Analyzer. And directly afterwards, OpenUI5 as the second one and I think in the meantime, we are also one of the largest ones from SAP out there. I don't know whether we are even the largest but definitely one of the largest.

Andreas Kunz: Yeah, maybe lets step in for the second one, open source in SAP has become much easier and has become like that for many things, almost the default way to do things, depending on what kind of stuff you do so the Open Source Program Office that has been recently founded is helping a lot, setting up the processes and helping other projects to be as open as we tried to be from the beginning. And so open source is really something that is getting bigger and bigger at SAP.

Karsten Hohage: That sounds like that was two. Is there a third one you want people to take away from today?

Peter Muessig: We really enjoy working with our community and we got a lot of feedback from you as the community. This openness, what we have here, this has driven a lot of innovation topics in the past and we got a lot of great feedback. So for us, this was really a big return of investment and it paid out absolutely. So I wonder why we didn't do it earlier. I think we could have benefited even more. But definitely, it was good

as it happened there. And interested developers with OpenUI5 they have now the chance to really play easily around with the open source availability and we really appreciate if you have input feedback for us, whatever you do, let it be an issue, pull requests, slack communication or direct message on Twitter, whatever, really contribute, get in touch to get involved. We also try to get involved as much as we can.

Karsten Hohage: All right, I love this as a final word. Thank you, Peter and thank you again, Andreas. This would then also be it for the day. Thanks for listening in to this first episode of 2021. It was nice to have Peter and Andreas here. It was nice that you listened in and if you enjoyed this episode, be back in two weeks from now or be aware that two weeks from now we'll post the next one. You can find this on openSAP and also in all regular podcast distribution channels like Spotify, Apple podcast, Google podcasts and so on. Thanks for listening in and goodbye.