



AADL and Edgewater

featuring Peter Feiler and Serban Gheorghe interviewed by Suzanne Miller

Suzanne Miller: Welcome to the SEI podcast series, a production of the Carnegie Mellon University Software Engineering Institute. The SEI is a federally funded research and development center at Carnegie Mellon University in Pittsburgh, Pennsylvania. A transcript of today's podcast is posted on the SEI website at sei.cmu.edu/podcasts.

My name is [Suzanne Miller](#). I am a principal researcher here at the SEI. Today, I am pleased to introduce you to my friend and colleague, [Peter Feiler](#), who is a technical lead and author of the SAE International [Architecture Analysis and Design Language, known as AADL](#). Peter's research includes dependable real-time systems, architectural languages for embedded systems, and predictable system analysis and engineering. In 2009, he received the Carnegie Science Award for information technology for his work with AADL. The AADL standards committee is meeting in Pittsburgh this week with members from throughout the globe to discuss evolving elements of the standard and to work together on action items from prior standards meetings.

So, Peter, you have brought [Serban Gheorghe](#) for us from the AADL standards committee. Could you introduce us and give us a little background on how his work relates to the AADL standard?

Peter Feiler: Yes. It relates in couple of different ways. One is he and I have the same background. We both grew up in Europe. In my case, Germany. In his case, Romania. He is now Canadian and I am now American.

Suzanne: There you go.

Peter: So, we are definitely an international team.

Suzanne: You are definitely neighbors. Serban works at a company called [Edgewater \[Computer Systems, Inc.\]](#) that is in the business of embedded systems and using formal techniques for doing that and just doing a lot of work for the Canadian government and so on. I will let him give you the details of what they're doing and why.

Serban Gheorghe: At Edgewater, we have two main products: We have a communication product. As part of deploying that communication product, it became clear that we needed some kind of a software environment to go with it. That is how we started to look at what is available out there. Our interest in AADL grew ever since.

Suzanne: When did you find out about AADL? Do you remember?

Serban: Probably about 2005.

Suzanne: OK. Right. So, after the first version.

Serban: In 2004. We joined the community a couple of three, four years ago. I think it's more than a couple years now.

Peter: Yes, time flies.

Serban: I got more involved in the technology. What we did in a AADL microkernel basically with the intent on transforming it into a product. We are still working on that product. We have a few pilot trials in different places.

The idea is to take AADL designs and convert them to our kernel and do all the static analysis in the same way and to have a very defined way of producing code, which is certified. So, the certification chain would be much easier to accomplish because it is always a constant concern.

Suzanne: Right. And, certification requires a lot of evidence

Serban: Exactly.

Suzanne: So, this is a way of reducing the labor of producing that evidence if you have this chain of certified components from the model into the kernel into the actual code.

Serban: That's right. The whole value proposition of our product was that—Independent of the models on the project where our tools are used and independent of the targets and how the targets are used—the same chain of tools tends to be used.

Suzanne: That reduces the labor-to-design for different targets also.

Serban: That's right. That's right.

Suzanne: That is also very good for you at Edgewater, right, in terms of efficiency.

Serban: So, that is basically the value proposition. I am also involved in designing the constraints annex of AADL.

Suzanne: You are working on the constraints annex. OK.

Serban: We are working with some groups from France, some groups from Russia, and some groups from the United States. So, it is an international effort. We have teleconferences from time-to-time and then try to...

Suzanne: This week you get to work together.

Serban: That is right, yes.

Suzanne: So, what do you think is important about building this constraints annex? What does that add to AADL as a language?

Serban: Well, it adds a standard way of doing analysis. There is a certain set of analysis tools that come with the [OSATE environment](#), which is the open-source.

Suzanne: The tool environment, yes.

Serban: But, you know, there will always be more analysis, which is project specific, and constraints, which are project specific, which have to be enforced. What we are providing here is kind of a generic sub-language to be able to express those concerns and constraints.

Suzanne: So, you are basically taking this idea of increasing the formality of how you express things away from... It is not just about formalizing how you express the architectural attributes, but you are also formalizing how you express constraints on the projects, constraints on the target, for example, so that all of this can be looked at together. Someone who has the right skills can really get a better picture of what is possible with this model versus that model or this target versus that target.

Serban: This is true, and this is a catalyst for new things. For instance, this will facilitate the evolution of a component in...

Suzanne: Into an area you didn't expect you could take it from.

Serban: So, you can now create AADL components and fully characterize them in what you expect to get from them in terms of assumptions and guarantees. Secondly, I think it facilitates this concept of integrating multiple tools with multiple formalisms from the same repository. There are no different assumptions made by different tools.

Suzanne: That would allow us more automation between those tools because we can look at the constraints on each, figure out which ones are compatible, which ones are not. Give an analyst: *You can do this, but you better not do that kind of information.*

Serban: Exactly.



Peter: And, you can then write specialized constraints for your project, and you don't have to implement a new tool to enforce those constraints. It comes automatically with the whole process.

Suzanne: Very nice. So, someday we're going to see AADL inside.

Serban: Exactly. It will happen.

Suzanne: I don't doubt it.

Peter: Again, when we do work like that with the constraints annex, we don't start from scratch. We try to leverage existing notations for constraints. So, there is a standardized notation called [PSL \[Property Specification Language\]](#), for example, that we use as one basis and then look at what are elements need to be added in to be useful in our context. That is the kind of work that these guys are doing.

Suzanne: Excellent. Well, thank you for contributing to AADL. I wish you well with your AADL-certified components, as with Edgewater. I hope you are enjoying your week in Pittsburgh. We will try and give you a little more sun.

Serban: Pittsburgh is beautiful.

Suzanne: It is. This morning was a little rough with the rain, but yeah, it is brightening up, so thank you very much for coming and joining us.

Serban: Sure.

Suzanne: If you, our listeners, would like more information about AADL and the work of the standards committee, please visit the AADL website at <http://www.aadl.info/aadl/currentsite/>. That's all one word.

Peter: Or, in short, www.aadl.info. Or the AADL Wiki at <https://wiki.sei.cmu.edu/aadl>

Suzanne: This podcast is available on the SEI website at sei.cmu.edu/podcasts and on [Carnegie Mellon University's iTunes U site](#). As always, if you have any questions, please don't hesitate to email us at info@sei.cmu.edu. Thank you.