Using the Smart Grid Maturity Model (SGMM)
Transcript

Part 1: SGMM Overview; A Profile of Current SGMM Users

Julia Allen: Welcome to CERT's Podcast Series: Security For Business Leaders. The CERT program is part of the Software Engineering Institute, a federally funded research and development center at Carnegie Mellon University in Pittsburgh, Pennsylvania. You can find out more about us at cert.org. Show notes for today's conversation are available at the podcast website.

My name is Julia Allen. I'm a senior researcher at CERT working on operational resilience and software assurance.

Today I'm pleased to welcome back one of my CERT colleagues, David White. David is our team leader for the Smart Grid Maturity Model project; we sometimes refer to that as SGMM.

And today David will be giving us an update on his team's work including a new survey method called SGMM Compass. And the survey is supported by an SGMM navigation process and a new role called the navigator that David and I will also be talking about. We have posted two previous podcasts on the smart grid and SGMM which you may want to check out for background information.

So with no further ado, welcome back David. Really glad to have you with us on the call today.

David White: Thanks, Julia. Glad to be here.

Julia Allen: To just do a little bit of stage setting if folks aren't familiar with SGMM, the smart grid work, or have listened in to the previous podcast, would you just give a little bit of a brief overview on our work and the maturity model? That would be great.

David White: Sure, sure. So the Smart Grid Maturity Model, some listeners may be familiar with other models that the SEI has developed or provided stewardship for including the CMMI Product Suite or the CERT Resilience Management Model. The Smart Grid Maturity Model or SGMM is -- it's different from those models because it's not a process model. Those models are really process models.

The SGMM is really a model of characteristics of a utility. So we like to say that it is a management tool. It's a management tool that utilities can use to plan their smart grid transformation or the grid modernization effort or to help plan their grid modernization effort, and to track their progress along that plan.

So the model itself is a structured set of characteristics. The characteristics are organized into eight domains. You can learn more about those on our website or in the previous podcast. And they're organized across six maturity levels. And so if you imagine that matrix of domains as columns and maturity levels as rows, there are 175 expected characteristics that describe -- well they're characteristics that you'd expect to see exhibited by a utility at various levels of maturity or in each domain of the model, which is to say they're characteristics that you'd expect to see of a utility along its smart grid journey or along it's grid modernization effort.

And so the model can be used to help develop a road map for grid modernization efforts at a utility and to track the progress on that journey.

Julia Allen: Just to make the domain a little more accessible to folks that are not well versed in this topic area, what are a couple of examples of some of the domains? And maybe a couple of your favorite characteristics? Are there a few that you like to use as examples?

David White: That's a great question. Let's see, So one of the domains is Strategy, Management, and Regulatory. Utilities are very highly regulated especially in the U.S. And I know they are around the world but I know more about the regulatory structure in the U.S.

So one of the domains in the model is Strategy, Management, and Regulatory. And some of the characteristics that you'll see in the model at level one (or the initiating level in the model) are things like smart grid vision is developed for a utility that has a goal of operational improvement. So clearly if utility is just starting their journey, which is what you'd expect to see at level one in the model in that domain Strategy, Management, and Regulatory, you'd expect them to have a vision for the journey or a vision for that modernization effort. So that's one of the characteristics you see.

And then at level three (a couple of levels up in that same domain), we see things like a smart grid governance model being established in the utility. In other words it's well on its way. It now has enough smart grid features in place that there's actually a need for a governance model and so you'd expect to see a governance model in the utility at level three.

At level five which is pioneering -- so that would be a utility that's really pushing the envelope. And clearly different utilities are going to find their comfort point from an objective view at various levels of maturity across the eight domains. So the utility might never aspire to achieve level five in Strategy, Management, and Regulatory.

But for a utility that does aspire to achieve that level and in fact for a utility that achieves that level -- we expect to see really pioneering characteristics, somebody who is really pushing the envelope. And so one of the characteristics at level five in Strategy, Management, and Regulatory is that new business model opportunities are emerging as a result of smart grid capabilities and are being implemented by the utility.

In other words, the utility is finding ways -- they're discovering new business models, new ways to earn revenue and grow as an enterprise as a result of the smart grid features that they've implemented. And they're exploring, they're implementing those new business models that are enabled by the grid transformation.

Did that help? Does that help give you a better view? That's just one domain, one of the eight, but that's Strategy, Management, and Regulatory. Other domains are things like Grid Operations, Organization and Structure, Value Chain Integration, Societal and Environmental, Work and Asset Management. So those are some of the other domains.

Julia Allen: Yes, those are great examples. Thank you, David for making the structure a little more tangible by those examples. So the model has been out there for a while. Can you give us a sense of how many utilities are currently using it and maybe a little bit of information about their profile or demographics?

David White: Sure, sure. Well it's interesting timing for this conversation because we recently crossed the 100 mark. So more than 100 utilities have -- are using the model or have taken the survey which is an indication that they've used the model. And I think we can talk more about the survey in a few minutes but let me tell you about the utilities.

If you look at the distribution geographically, then a little more than half of those utilities are in the United States. And the other half are distributed fairly evenly across Europe, Asia-Pacific, Canada, Mexico, and Central and South America. The only continent that we don't have participation from so far is Africa. So that's a geographic view.

If you look at the participants from the size view, we also have a pretty interesting distribution. In fact one of the documents you can download from our website shows that size distribution for utilities that have taken the survey. And at the very top is a utility that has 34 million meters; this is one way to measure a utility size. And at the other end of the scale, the smallest utility that has taken the survey so far has only 1500 meters. So that's another way to look at the across the population of users.

A third way that we look at it is what kind of function are they providing on the power grid? And if you look at that distribution, you'll see that about a quarter of the utilities that have completed the survey are distribution only utilities. So they're just in the electricity distribution business.

Another quarter of the utilities are fully integrated. In other words they provide generation functions, transmission functions, distribution functions, and retail functions so they're fully integrated utilities. And the other half, or roughly half, are various combinations of those four functions.

Julia Allen: Excellent, great. Thank you for giving us that picture of the SGMM user community.

Part 2: Using SGMM Compass to Assess Smart Grid Performance

Julia Allen: So let's talk a little bit about the survey and some of the new methods and techniques that your team has developed. I know that one of the methods that the utilities and the supporting service providers are using to assess their performance with respect to smart gridness is a survey that we call SGMM Compass. So could you tell our listeners a little bit about Compass and how you're using it?

David White: Sure. So the short answer is that Compass is a survey and if the utility completes that survey and has a score, what they get is a maturity rating in each of the eight domains in the model, so one rating for each domain in the model. That's the simplest way to look at it. It's just a survey that a utility can complete and have scored.

And so it is the only instrument as part of the Smart Group Maturity Model product suite, it's the only instrument that provides that maturity rating. It provides feedback on where a utility is in its grid modernization effort as characterized by the SGMM.

If we take a closer look at the survey, we will see it is made up of 12 sections and the first four sections of the survey include questions about the utility itself; some things like name and address and point of contact. Those four sections also collect some standard performance information about the utility's grid. Also size count, meter count -- things like that are covered in those four sections.

And then sections five through twelve are one section for each of the eight domains in the model and those sections include one question for each of the 175 characteristics in the model. And those questions are multiple choice questions that are designed to get a sense for the extent to which a utility exhibits the characteristic that's behind the question. So overall there are about two hundred questions in the survey.

And as I said at the beginning of my response, the overall output is a maturity score for each level in the domain but a utility that completes the survey also gets some really interesting community data. Each utility that completes the survey with summary statistics on how other utilities have answered the questions in the survey and how other utilities have scored in the survey. So this can be -- some utilities have found it to be validating, so "Wow, we -- it turns out we're kind of in the pack here. We are kind of in the middle of the pack." So that might have you feel good about where you are on your journey.

You might also find for a given question that you're a real outlier. So you might be answering -- your answer to one of the survey questions might be -- maybe only five percent of the utilities that have completed the survey have provided the answer that you provided. And so it might cause you to stop and think, "Well why am I in the minority response in this question in my community? Is there something different about my strategy? Is there something different about my regulatory environment, or fundamentally different about my business structure and plan?"

So there's a lot of potential insight that's available to a utility by taking a look at the summary data that we provide in the reports as well.

Julia Allen: So in effect, they're getting the benefit of all of the utility organizations who have taken the survey up to that point as part of the results that they get when they take, when they do a Compass survey themselves, correct?

David White: Right, exactly. And that's one of the things that I really love about this model. That it provides every user of the model -- contributes data that provides some benefit to every other user of the model. It really is a community value structure that we've tried to build into the Compass survey and the report from the survey.

Julia Allen: Okay, so let's dig into this a little bit further because I think it's really interesting the way you've structured the process by which organizations, the choices they have when they're using the Compass, the SGMM Compass survey.

So I understand that there are two ways that they can engage the survey. One is they can just do it themselves, and that your team has also created an expert-led navigation process in a new role for educating and conducting that process called the navigator.

So could you say a little bit about the navigation process and the role of the navigator when it comes to conducting the survey? And why would that be more attractive than just having an organization do it for themselves?

David White: Well so this is a new part of the product suite that we rolled out with version 1.1. So we introduced version 1.1 of the model and of the product suite late last year, and part of the change that came with version 1.1 is this new way to complete the survey. So utilities can still perform a self-assessment. They can get a scoreable version of the survey, complete it, and send it in, and they get a scoring report.

They actually get a phone call and access to a model expert to help them interpret their survey report once they get it. So that's the self-assessment. That's the lightest way to complete the Compass survey instrument.

The navigation process that you mentioned, the SGMM navigation process, is new. And it is led by a navigator as you mentioned. Let me tell you about the process and then I'll say a few words about this role, the navigator.

The navigation process is, it's a five-step process that leads a utility through both answering the survey, answering the Compass instrument, and using the results of that to set some objectives that then they use for their grid modernization road map,okay?

So the five steps are: (1) preparation. Preparation is just the utility and the navigator work together to plan the rest of the process really. The second step is (2) a survey workshop. And in the survey workshop all of the key stakeholders from the utility (the people inside the utility who really know how the utility is doing and what the utility is doing across the eight domains that are described in the Smart Grid Maturity Model), those stakeholders come together and they spend about a half day in a room with the navigator answering the Compass survey.

It's a very valuable workshop, utilities have reported, because in arriving at consensus responses to the survey questions, those stakeholders and the utilities spend time together talking about where the utility is and what the utility is doing in its grid modernization efforts in a way that we hear from a lot of utilities that they don't generally have the opportunity or make the opportunity to have those kind of conversations.

So the kind of rich conversations that the utility stakeholders have when arriving at consensus responses to the survey in the survey workshop is a key value -- it's one of the key values of the navigation process.

And so once the survey is completed, step three (3) is that the navigator has the survey scored and then the navigator does some analysis in preparation for a second workshop. And that second workshop (4) we call The aspirations workshop where we bring, we assemble that same set of stakeholders, perhaps even some additional stakeholders from the utility, to hear the results -- the results and the analysis that have been put together by the navigator.

And then they walk through the model based on where they are from the Compass survey and set some aspirations for where they want to be in the planning horizon, maybe two years or three years out. "Where do we want to be as a utility in model terms?"

And they have discussions among the stakeholders and reach a consensus position around where we want to be. So then you come out of that second workshop knowing where you are in the model terms and the utility has set an objective for where it wants to be at some point in the future. So planning the trajectory between those two points is very valuable input for a utility's strategic planning process.

One more thing that comes out of the aspirations workshop is a set of motivations. So once the stakeholders in that workshop agree to an objective in the model terms for some future point in time, they also make a list of their motivations. "So as a utility what motivates us to be at this point at some time in the future? What actions would we have to take to achieve that objective? And what obstacles do we have to overcome to achieve that objective?" Those elements, the motivations, actions, and obstacles, are additional very valuable input to the strategic and tactical planning process at a utility for grid modernization.

So the navigation process really supports a utility in using the model as a road-mapping tool. The fifth step (5) is just a wrap-up step where all of the output from that second workshop are organized and delivered to the utility by the navigator.

Julia Allen: And then by virtue of the name, I would assume that the navigator is, obviously, an expert in the model and an expert in the process that you've just described and would lead the organization in an expert-led way through the process, is that right?

David White: That is correct. There's one additional piece of expertise that we require for navigators. Navigators are also industry experts. And we have put together a training and certification process that takes people who want to be navigators -- who have the requisite skills, knowledge, and expertise about the electric power industry -- we take those electric power industry experts and train them to be SGMM model experts. And we teach them how to lead the utility using the navigation process. We give them a detailed script and notebooks and templates and all kinds of supporting elements to help them with the navigation process and that's what makes a navigator.

Julia Allen: Excellent, excellent. Thank you very much for telling us about some of those new offerings and I'm sure that they'll continue to add value to the community being served by the model.

Part 3: SGMM Improvement Trends; Plans to Collect Better Performance Data

Julia Allen: So speaking of which I saw in your October 2010 SGMM Update that's available on your website that you actually are starting to see some repeat use of the SGMM survey to track improvement, progress, and some early trends. So can you tell us a little bit about that insight?

David White: One of the things that we do, Julia, because we are collecting the data from the community once a year at this point (we may increase that frequency in the future), but once a year we publish a report that shares with the world what we see from the data that we have collected from the organizations that have completed the survey.

In our most recent report which was published in October of 2010, we included some information about utilities that have taken the survey at least twice. So at this point that's still a fairly subgroup of the 100+ users of the model.

So there are a couple of interesting observations that can be made if you look at that data. First of all, across three of the model domains the utilities that had completed the survey twice have made substantial improvements as a community. So if you look at their average score for the first time they took the survey and their averages for the second time they took the survey, you see substantial improvements across three domains and those three domains are Strategy, Management, and Regulatory, that's the first domain. Second domain is Organization and Structure. And the third domain is Work and Asset Management.

I'm not sure what we can deduce from that observation but that's where we see the biggest improvements among the repeat users. We see modest improvements across four of the domains and those domains are, the first one is Grid Operations, the second one is Technology, the third one is Customer, and the fourth one is Value Chain Integration.

And then in the eighth domain, Societal and Environmental, we actually see a very, very slight decline from the first time use to the second time use. And that's a little bit intriguing. We think that the reason for that very minor or very slight decline is because in version 1.1 of the model, and many of the people who took it a second time did complete version 1.1 of the survey, we added some characteristics to Societal and Environmental at level one because many users had commented that they thought level one of Societal and Environmental domain needed to be improved, it needed to be beefed up a little bit. So we did that and we may have made the instrument just a little bit more difficult as a result. But that's what you see if you look across the users that have taken the survey at least twice.

Julia Allen: Excellent. Well thank you, Dave, for that early insight. And hopefully as more users do have repeated use of the model, in your regular updates and reports, we'll be able to gain further insights on how improvements are taking place. And again, it's a kind of an interesting benchmarking for an organization to compare its own improvement with the community at large, right?

David White: Right exactly. And you know it may tell us something about where the utilities are focusing their energy.

Julia Allen: Okay. So I'm sure there's still a lot in front of you and your teammates with respect to this project so what are some of your near-term plans? And for listeners that have interest in this topic area, if you could point them to some resources that would be great.

David White: So our plans for this year -- we released version 1.1 last year. We do plan to issue a point release toward the end of 2011 (it might be in early 2012) but we do plan to release version 1.2 of the model suite. The improvements that we plan to make in version 1.2 are primarily focused on the performance data we're collecting.

So one of the things that we're aware as on the project team at the SEI is that as we collect this data, we have an opportunity to watch utilities at various points in their grid modernization activities. And so we're really curious to see how some of the performance measures around the electric power grid might change as utilities start to make these grid modernization improvements or smart grid improvements.

And so in version 1.2, we're going to revise and improve the performance data we're collecting in the first four sections of the Compass survey that I mentioned. That will be the most substantive change in version 1.2. And in addition to that, there will be modest editorial improvements across the model suite including the survey, the model definition document, the navigator training, and the navigation process. All of those things will receive some improvement in version 1.2 but the performance data is the focus.

Julia Allen: Great, and for listeners that want to learn more, where would you refer them to?

David White: Our smart grid website on the SEI webpage is the best place to go. We can also provide, Julia, we can provide the listeners with our information request email. So we have an email address that we provide folks who have questions about the model or who may want to become a navigator or they may want to, maybe a utility who wants to complete the survey.

Julia Allen: Great, we'll put all that contact information in the show notes, Dave. That's great.

Well listen, I really appreciate your time today and the work that you and your team are doing in a very, very fascinating arena that all of us both as professionals and personally in terms of our homes, I know I just had a smart meter put up on my home -- we're all going to be affected by this if we aren't already so fascinating work and I thank you so much for the update and insight today.

David White: Thank you, Julia.