



**HIT Standards Committee
Architecture, Services & Application Program Interfaces Workgroup
Final Transcript
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Presentation

Operator

All lines are bridged with the public.

Michelle Consolazio, MPH – FACA Lead/Policy Analyst – Office of the National Coordinator for Health Information Technology

Thank you. Good afternoon everyone, this is Michelle Consolazio with the Office of the National Coordinator. This is a meeting of the Health IT Standards Committee's Architecture, Services & API Workgroup. This is a public call and there will be time for public comment at the end of the call. As a reminder, please state your name before speaking as this meeting is being transcribed and recorded. I will now take roll. Arien Malec?

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

I'm here.

Michelle Consolazio, MPA – Federal Advisory Committee Program Lead – Office of the National Coordinator for Health Information Technology

Hey Arien. David McCallie?

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Here.

Michelle Consolazio, MPA – Federal Advisory Committee Program Lead – Office of the National Coordinator for Health Information Technology

Hi, David. David Waltman? Gajen Sunthara?

Gajen Sunthara, MS – Presidential Innovation Fellow – Department of Health & Human Services

Yes, I'm here.

Michelle Consolazio, MPA – Federal Advisory Committee Program Lead – Office of the National Coordinator for Health Information Technology

Hi, Gajen. George Cole?

George Cole – Principal Scientist, Community Solutions – Allscripts

Yes, I'm here.

Michelle Consolazio, MPA – Federal Advisory Committee Program Lead – Office of the National Coordinator for Health Information Technology

Hi, George. Indu Subaiya? Janet Campbell?

Janet Campbell – Software Developer - EPIC Systems

Here.

Michelle Consolazio, MPA – Federal Advisory Committee Program Lead – Office of the National Coordinator for Health Information Technology

Hi, Janet. Josh Mandel?

Joshua C. Mandel, MD, SB – Research Scientist – Boston Children’s Hospital

Hello.

Michelle Consolazio, MPA – Federal Advisory Committee Program Lead – Office of the National Coordinator for Health Information Technology

Hi, Josh. And Sean Nolan? And is Debbie Bucci on from ONC?

Debbie Bucci – Office of Standards and Interoperability – Office of the National Coordinator for Health Information Technology

Debbie’s on the line.

Michelle Consolazio, MPA – Federal Advisory Committee Program Lead – Office of the National Coordinator for Health Information Technology

All right, with that I’ll turn it over to Arien and David.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

By the way I’m just going to complain that I don’t think it’s going to get over 65 degrees today, so, I’m a little bummed.

W

Hey man, I’m in Florida, so...

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Oh, there you go.

Michelle Consolazio, MPA – Federal Advisory Committee Program Lead – Office of the National Coordinator for Health Information Technology

No comment.

George Cole – Principal Scientist, Community Solutions – Allscripts

We hit 31 in Cleveland today.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yeah, there you go. That’s warm. All right, well this is the second meeting, the second official meeting of the HIT Standards Committee Architecture, Services and API Workgroup, which I guess no longer is known as the APIS Workgroup, which makes me sad, and is now known as the ASA Workgroup, because

we had a headache every time we meet and need to take some aspirin. So we have an interesting framework to present today and discuss, based on the discussion that we had last time. I certainly learned a lot in our last meeting for how to think about some foundational components for HIT standards and I guess we're presenting back for consideration some framework information from that last meeting. If we go on to the next slide; oh, welcome, roll call. We did that one. Should we review the upcoming work plan? Ah, the member list; keep going. There we go, FACA milestones.

So I believe that real soon now there will be an Interoperability Roadmap and I believe that we are going to be asked to comment on the Interoperability Roadmap and it would be useful to do so according to an architectural framework for thinking about interoperability, so that we're not making...so that we're making the comments on the Interoperability Roadmap from the perspective of some higher level thoughts on architecture services and APIs.

So it would be, I think, useful today, in today's meeting, to at least have a draft of the framework that we could then apply to the Interoperability Roadmap where...I guess the way I'm reading this slide is that coming in February we'll be charged with responding to the Interoperability Roadmap, which is kind of funny, but, we'll have a session on commenting on the roadmap. And then I think we're discouraged from reading between the lines here, but I think we're going to be charged in March with commenting on the Certification NPRM and have a bit of time for commenting on the Certification NPRM. So, I think this is our last time to put together a framework before we're drowned in real work. Michelle, do I have that right, modulo your inability to comment on specific dates?

Michelle Consolazio, MPA – Federal Advisory Committee Program Lead – Office of the National Coordinator for Health Information Technology

Yeah, that was perfect. As you mentioned, Arien, we're planning for us a joint February 10 meeting for there to be a thorough review of the Interoperability Roadmap and then there will be specific charges based upon the roadmap that each workgroup will get charged with. And there might be some overlap, depending upon when the Certification Rule is released in timing. And so there may be some things that overlap...and so we won't be overburdening you too much.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Okay.

Michelle Consolazio, MPA – Federal Advisory Committee Program Lead – Office of the National Coordinator for Health Information Technology

But we'll have to...

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

But I still think that based on this timeline, this is our last time to actually...

Michelle Consolazio, MPA – Federal Advisory Committee Program Lead – Office of the National Coordinator for Health Information Technology

Yes.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

...have a framework that we could be using for discussing the roadmap and/or Certification NPRMs. So, let's go on to the next...any questions on that overall work plan? Coolio, let's go on to the next slide. In our...so, here's our charge, define architectural patterns sufficient for an ecosystem...we should fix that

one again...an ecosystem of nationwide scale information sharing and modular applications, serving patients, providers, provider organizations and researchers. And then subject to those architectural patterns, explore technology policy to promote adoption and use; define and make recommendations on standards, implementation guidance and certification criteria. And make recommendations on incremental progress toward proposed architectural patterns consistent with roadmap and strategy. And I think we're going to be going bottoms up. So, this meeting will be primarily about bullet 1 and then next few meetings will be about bullet 4 and then bullet 3. And then hopefully we'll get to pop back up to bullet 2. Questions on the charge? Next slide...yes.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

This is David, just to elaborate and reiterate really more what you said which is that I think the thought here is that this is our chance to think more abstractly about these architecture patterns or I think what we refer to them as design patterns later in these slides, before we get inundated with the minutiae of the actual roadmap. So today is the day to zoom out, think big and broad, long range, because our next couple of meetings will be focused in on something concrete to react to.

So, I'm looking forward to this as an exploratory, thought provoking conversation. Are we moving in the right direction? Are the notions that will serve us in the later slides worthy of pursuit in light of this high level goal of define architecture patterns; because next meeting we'll be reacting to specific proposals, hopefully in the context of some thoughts about the broad architecture patterns.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

All right; next slide. So in our last meeting, we talked about acknowledging that we've got a current set of certification criteria and certification editions and meaningful use stages and yet we, I think, believe that we need to move towards a more modular, API-based approach that's consistent with the vision to build incrementally. We're about raising the floor and raising the ceiling and primarily want to talk about the notion of architectural design patterns that can be used to evaluate interoperability frameworks and needs so that we have, as I said, a framework for thinking about things like a roadmap or certification criteria. Go on to the next slide.

We talked about architectural components that enabled broader scale and we talked about again the notion of a framework and objective metrics. Some of this actually overlaps with some work that the NWHIN Power Team did in creating a standards evaluation framework, but I think for our focus it should be about how to loosely couple services that enable...scale. Let's go on to the next slide.

So we did some work, David and I did some work to take the discussion last time, and I think one of the biggest lessons that I took away from last meeting was the notion of a reusable, composable health data language as a key component of the HIT architecture. And that was really useful in thinking about, for example, HL7 V2 and why HL7 V2 was such a success for so long. So, what we're proposing here, for purposes of discussion, is a framing of mapping what we've seen as web scale architecture to the problem of health information exchange. And so as I said, we're proposing this as a framework for discussion purposes; can we go to the next slide.

As a reminder, the hourglass model supposes that there are some core services on which there is homogeneity, a single way of doing it and that that homogeneity generates heterogeneity both at the bottom of the stack, in terms of ways of implementing; and at the top of the stack, in terms of a wide variety of applications and use cases that get server in terms of the elements lower on in the stack. The prototypical hourglass model had TCP at the thin waist of the hourglass. It had UDP and IP at a level up

and other sort of foundational routing standards at that next level up. And then heterogeneity was things like SMTP, HTTP, and the application protocols that were built on top of TCP. And then below the stack were the variety of Ethernet and Wi-Fi and all of the enabling devices.

The next slide proposes or talks about why the waist gets narrowed and uses the example of HTTP as sort of an interesting example of convergent evolution or of pruning evolution, if you will. I think many of us remember the early ought's in the late 90's when we were trying to figure out how to do distributed objects and the approaches ranged everywhere from HTTP as post to CORBA and X...that should be XML-RPC, SOAP and then slightly later, REST and AJAX as alternative models for doing distributed objects and distributed services. What happened over time was that the full stack was implemented in the .Net platform and the JavaEE platform. But over time, HTTPS, because everybody had to implement it, became the lingua franca and became universal.

And it's to the point where there literally is no SOAP stack that you can meaningfully deploy on an IOS device. There are basic SOAP stacks that you can deploy on a Windows mobile or an Android device; they don't do a whole lot. And many programming languages and frameworks don't have a well maintained or well supported SOAP stack or XML-RPC stack and CORBA's kind of gone past the wayside. And so what we end up with is HTTPS as the universal transport that literally everything supports.

You see the same trends right now in an evolution from XML to JSON, and some of this is presumed technical merit and some of this is everybody's got to implement JSON anyway because everybody wants to implement a rich front end and so you've got to represent your data as JSON anyway. And so you see an evolutionary trend towards, on the UI stack, consolidating on a single homogeneous standard; if we go to the next slide.

The way this looks, and this is a framework we're going to be using going forward, the way this looks is that there's a parallel transport and security stack and a UI/API stack where on the right-hand side we've got relative consolidation to HTTP and TLS. We've got emerging use of OAuth 2 and even more emerging use of OpenID Connect. And that's pretty much the transport discussion; there is some enterprise use of SOAP services and the like, but if you look at transport broadly, these are the elements that are presumed and anything else might be application specific.

On the left-hand side is UI and data or API stack. And again, we've got homogeneity on HTML5, at least a core sub-set of CSS and JavaScript and then homogeneity on everyone supports JSON and XML. And on the basis of those two foundational stacks, you get pretty much everything that we have on the Internet. And you've got, below those stacks, a wide proliferation of enabling technology. And I think the core insight here is that you've got to have some level of standardization of the transport and security layer and some level of standardization at the UI, data building blocks layer in order to get ease of implementation across enabling technology and in order to get the wide variety of proliferation of capabilities that we have on the web. So I'm going to pause there; David, welcome your comments as well, and see if there are any comments or feedback, at least at this level.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

This is David; just I think the way, Arien and I went back and forth about the best way to label this and represent it and there's no right way that is perfect but I like to think of it as kind of the services, the AP...what I would call the APIs, the transaction and verbs if you would that are used to make things happen, to move data around, are on the right-hand side. And then on the left-hand side is really mostly about data, even though in HTML we have a mixing of user experience and data together. Maybe in an

alternate universe you could make a cleaner separation of those, but for better or for worse, we use HTML to carry both data and user experience around.

But, we're going to go forward from these slides, when we get into the healthcare stack, to kind of have transport and security on the right and data on the left. And you'll see where we go with that, but that's...it's a little tricky to figure out what to call it, but that's the spirit of what we're trying to get. I think the word API or the phrase API is so vague, because it means a little bit of all of the above.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Data-oriented services might be a better term.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah, yeah and we'll get to the question of is FHIR an API or is it a specification around data or is it a specification around data with a suggested way to use the data. I mean, it's kind of all of the above if we roll it up into a notion called an API. But, we just tried to tease it apart here and say that there's core services, core capabilities for manipulating moving data and managing transport and security that are the core of the Internet on the right and then a set of capabilities to move data around in a standardized fashion on the left, which in the healthcare world is going to look different from what it was in the Internet, but we want to try to pick up the parallels here under the assumption that there's something to be learned from those reusable patterns that have been so successfully deployed in the Internet.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

So when we go on to the next slide, we're going to be proposing the design elements, if you will, for HIT interoperability and then we're going to be looking at ways that those design elements have played out in a variety of eras of interoperability. So, just so you can expect what's coming. So if we go on to the next slide.

This really...so on the right-hand side is more or less the same elements that we had in the web or Internet stack. On the left-hand side, the data side of this, the key insight from last meeting was this notion of a composable health data format and then the notion of common messages and common services. You could also talk about common document elements, but there's a...it seems like there's a big idea in health interoperability that there's a...there are some bespoke protocols like NCPDP, but there's also kind of this big idea of a composable health data format that can get remixed into common ways of doing things and then those common ways of doing things can get remixed into implement, particular use cases, implementation guides, in order to serve the proliferation of needs.

And if that's too abstract and vague for you, we're going to go on to the next slide where we specialize this model for V2 and where transport and security on the right-hand side was TCP with MLLP, security was mostly in the early days internal networks and then later VPN and some TLS and that sort of thing. But the big idea here was that we had V2 segments and fields. We had standard compositions of those segments and fields into high level messages. And then we had a proliferation of implementation guides that is so successful that what I think V2 started emerging in the mid-90's, do I have that right? And 20 years later still going and still going pretty strong.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

So V2 goes way back.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yeah.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Back before you were born, probably.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Wes could be the historian, but I first remember hearing about it in Pharma discussions because there was this thing in healthcare that people were trying to figure out if that could actually be a better way of transporting lab data around than lots of flat files.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah, no, we were implementing V2 in the 80's at Boston Children's, I remember. I don't know that we called it V2 at that time, but it was essentially what we have today as V2, so.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yup, so 30 years and running and still pretty successful; so, I'd like to pause here and just see if this framework and the application of the framework to V2 makes sense. Is it confusing? Is it explanatory? Is it...basically is this a useful framework because we're going to try to keep applying it?

George Cole – Principal Scientist, Community Solutions – Allscripts

Arien, its George. So I really like the symmetry of this, the left side, right side and the concept that through the middle you can work on the idea of the composable objects. I think we have to be very careful when we go from the first very abstract presentation of the model and you get to a specific like this one, that we make sure people realize this is a very specific focus because otherwise you could run into lots of disagreement that V2 segments are not really...I mean, when you're looking at this just as V2, yes, absolutely there...that composable layer, but that doesn't generalize.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yup.

George Cole – Principal Scientist, Community Solutions – Allscripts

So...but the title of the slide is just something to reinforce.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

That's right and that's actually what was intended by these issues is, V2, as we know, poorly evolved in the sense that there are fields that are deprecated and then the segment field links guide extended and then there are repeating sub-segments and there's variable semantics and all that fun stuff.

Janet Campbell – Software Developer – EPIC Systems

One thing...this is...go ahead.

M

This is...

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yeah, sorry, Janet first and then...

Janet Campbell – Software Developer – EPIC Systems

Oh, well I was just going to say, this is Janet; the only think that I see sort of missing, and perhaps it's just because we're still on the HL7 V2 slide, although I think it might apply anyway, it's that for me there's I guess a dimension that is neither transport nor data but more along the lines of etiquette almost. So if I say "X," you say "Y," I respond with "V," etcetera; sort of the order in which we say our things back and forth. So, maybe that's one of the spikes that is coming out of the center. Also, HL7 started in 1989.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Ah...yeah, a little bit of orchestration...

Janet Campbell – Software Developer – EPIC Systems

Yeah.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

...service orchestration. Yup.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

And this is David, just to comment on that. I think when we get later deeper into this, I think the proposal is going to be that maybe some of those orchestration conversations can themselves become reusable patterns that we will pick up and apply to future interoperability challenges. So...

Janet Campbell – Software Developer – EPIC Systems

I like that.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

...this is the basement, we've got a couple of floors still to climb.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Although it is really clear that you can see that level of message orchestration in V2 with...in the message segments with axon and axon and error messages and the like. So, it does belong even here in this implementation.

Joshua C. Mandel, MD, SB – Research Scientist – Boston Children's Hospital

This is Josh; I was going to make a comment actually when we got to the FHIR version of this slide, but I'm happy for the opportunity to make it right here on the V2 version because I think it applies to both. I see a distinction between the Internet hourglass model that you showed previously and this healthcare specific one which is, at the center of the waist in the Internet model, anyone can sort of build on the data protocols and send whatever kind of information they want to. Almost unilaterally you can make a decision to say, I'm going to build the following protocol on top and just do it whereas in the diagram here the V2 segments and fields just make up their own, right?

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

That's right.

Joshua C. Mandel, MD, SB – Research Scientist – Boston Children's Hospital

That's the thing that goes through a standardization process so you're limited in the way that you can compose these things by what you can get through an HL7 balloting process, for example, even at the center of that hourglass. I would say a similar thing about FHIR.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Although these segments and those kinds of things were a little bit of an escape route, but I think in many ways the analogy is more to something like HTML 5 than it is to JSON as a kind of meta-standard.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah, this is David. I...that's why when Arien and I went through these slides before I kind of pushed him hard to include the notion of the data side with HTML being treated as something that's at the core that you don't have the freedom to just willy-nilly extend.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yup.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

So I think there's quite a bit of parallel, actually, to the way the Internet has actually worked, the traditional Internet hourglass doesn't put HTML at the waist, but I think you could look at that as a waist-level component. Because it is what is shared across all implementations of servers and browsers and then people do really interesting things in the context of following the rules of HTML, which of course evolved over time, but at any point in time there was an official definition.

Joshua C. Mandel, MD, SB – Research Scientist – Boston Children's Hospital

Yea, so I agree that it's a better analogy, HTML to whatever you're putting in the middle here, although I'll just point out that we're having to tweak the way that people look at that traditional Internet hourglass diagram by asserting HTML in the center, in order to make our case here, which is maybe just a small warning flag.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yeah, although I would argue that there's actually very similar trends that...since everybody implements HTML 5 in more or less the same way across browsers, you get any web app you want and that actually is, I think, a reasonable analogy for what we're trying to get in health interoperability.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

And it's...the HTML or the Internet hourglass model, as you...if you just go look it up on the web is a single stack, if you would and what we tried to do here was to make it two sides, there's a transport side and a data side.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yeah, there might be some explanation in that we're looking at the hourglass model as an architectural pattern...

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

...not as a one set, you know, TCP at the middle and never shall it be approach.

Joshua C. Mandel, MD, SB – Research Scientist – Boston Children's Hospital

Yeah and think it's a perfectly good story to tell, we should probably make that explicit as we're describing the analogy.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yeah, fair point. Good. The next slide may be controversial, so, I warn you. The V3, for lack of a better term, the V3 HITSP era on the transport and security side, we had a mix of V2 over TCP and MLLP for things like V2 PIX and V2 PDQ and then the WS* stack primarily over HTTP and TLS as alternate transport and transport security stacks. And then on the composable data element stack, we had almost four or three and a half ways of doing it. We still had V2, we had some use of V3. We had V3 specialized to CDA and then we had an OASIS meta-model and we could put some other meta-models in here, SAML and XACML and the like.

We had a set of meta-models that were also used and then those were used in turn to compose use case oriented profiles. So, one to do document level exchange and look up; one to do one variety of patient exchange and another to do another variety of patient exchange and in some cases, there were two ways of doing it. So, I just wanted to pause here, David, if you had any comments on this, just see if it resonates, makes sense, you know, vociferous negative reaction to it.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Well like all analogies...this is David; like all analogies it has its flaws, but I think it carries forward this way of thinking about what was at the core and then what got extended above the core. I think our conjecture might be later on that it was overly complex and it had too much at the core with the mixing of ebXML, ebRIM with the RIM and all of its variations and complexities.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yeah, I would argue that there was too much at the core and then not enough at the parsimony layer, if that makes sense. You kind of jump from these core concepts that you needed and then you specialize them to particular use cases and I think we did a decent job of that. But, for people who have tried, it's actually kind of hard to say, oh, I want to take this but I want to take a little bit of this and a little of that and make another one of those; you were either in the sweet spot of the profile or you were out.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah...it's David again. If you were trying to come up with the smallest spanning set of vectors to describe the space, I don't think we landed there very well in the V3 era, I mean that's a conjecture obviously, I can't prove it, not even quite sure I can explain it, but, it...there's a lot of redundancy, there are inconsistencies, there are multiple ways of doing things, there's lack of specificity. So even though it fits the model in the sense that there was a set of shared core concepts in the various RIMs that were in the middle there, it was not certainly parsimonious or simple to use. But that's, I think we'll...let's keep moving to the points of where we are today and...

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yup.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

....because this is...

Janet Campbell – Software Developer – EPIC Systems

Can I...

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yes.

Janet Campbell – Software Developer – EPIC Systems

...just before we go on, speaking to sort of the point I was making before where we might have orchestration as the V-axis coming out of the screen.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Sure.

Janet Campbell – Software Developer – EPIC Systems

It works pretty well on this slide because then you can put sort of the PCC profiles, you know, the different flavors of CDA on the left-hand side and you can put the ITI profiles, the orchestration on the V-axis and then the...it gets less crowded on the left side, but I think that sort of separates more data and services a little bit.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yup, fair point. And I think we're going to try to cram both the data and the orchestration on the left-hand side because...unless we can rotate slides. But I think it's a fair point to carve out orchestration from data. All right, now the next one.

So I think we're asserting in this slide that there's the flavor, the hopeful flavor and Janet to your point, we should put orchestration here as well there is the flavor of enabling generality and parsimony that hopefully should generate the level of heterogeneity that we're looking to on the services and use case side, where FHIR core resources and some of the primitive concepts like codable concept and the like serve as a...as the composable data element layer. HTML5 and that stack, at least for portions of this, can play a role in a...in a web App with FHIR orchestration layer and then profiles and the private services like get a patient list or get a medication list, add a medication to a medication list can serve some of the aspects of orchestration.

This is a...this is not a proved model, but I think the assertion here is that given the model that we've...the framework that we've set out, this is a better fit for the framework or more HTML version 2-like in the context of the framework than we've seen. Not to say, and I think our previous discussion said that we shouldn't say that FHIR is the be all and end all because in 10 years we may well be with - Quantum Microstate-based profiles but that something like composable data and something like composable orchestration and constrained profiles probably needs to be in the stack. So I'm going to pause, David, if you have any comments here.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Just to say that these are the building blocks above the...on the left and on the right; we may see emerging higher level, let's call them orchestration that we would want to standardize around, that they would layer over these core layers. So just like with the Internet where you have things like SIP and VoIP and other things layering over lower level core protocols of the Internet, we would expect to see the same thing happen here, we just don't know what they are yet, that's really maybe what our exercise is in the long run is to fill out what's missing above FHIR core and FHIR profiles on the left-hand side and above HTTPS and OAuth, Open ID on the right-hand side. Because I'm sure there will emerge higher level orchestrations. That white space up there is really what I would like to think of as our target in the

long run in this group and we'll throw some notions of that out here in a couple of slides, just to make that less...slightly less abstract.

I think the other...again David here, just the other issue is you can map a lot of things to the hourglass model, that doesn't necessarily mean they are all therefore okay. There's a simplicity factor and a complex...I guess complexity and simplicity are other ends of the same spectrum that makes some of them work better than others. And I think the complexity of that V3 model as contrasted to the relative simplicity of the one that's on the screen now, the FHIR-based model is hopefully not just an artifact of our slide making approach, but in fact captures a simplification of the approaches for interoperability going forward.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yeah, this is Arien. I guess the way I'd say this is that there's an idea here that I think in the V2 example had legs and had legs for a long time that seems to be a generalizable idea. There's an assertion that FHIR can play the same role, and I think an excitement that FHIR can play the same role. I guess the point that I would make is that something...if FHIR doesn't play that role, we should keep searching for something that can and does; that it's an important aspect of the...I think the assertion of these slides is that pattern is an important aspect of the HIT interoperable architecture. So at that point I think we'll throw it up for feedback.

George Cole – Principal Scientist, Community Solutions – Allscripts

So it's George, I think that's a very interesting comment and it almost suggests yet another slide; FHIR may be the instance of what might fulfill that role, but maybe we have a slide where the composable resources on the data side and simply HTTP plus TLS and OAuth on the right are the ideal for which we are looking and here's an instance.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yeah and...

George Cole – Principal Scientist, Community Solutions – Allscripts

I'm not sure that that's...I'm sorry.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

...that was the intent of, sorry...that was the intent...this is Arien, that was the intent of four slides back, so maybe we just want to repeat that slide...

George Cole – Principal Scientist, Community Solutions – Allscripts

Thirteen?

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yeah.

George Cole – Principal Scientist, Community Solutions – Allscripts

Yeah. So there I think that's a little more abstract than what I was...

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Okay.

George Cole – Principal Scientist, Community Solutions – Allscripts

...I'm...I don't know, I don't know if we want to go so far as to say, not just a common transport but this particular transport.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Um hmm.

George Cole – Principal Scientist, Community Solutions – Allscripts

Or maybe HTTP is just yet again another example of the actual implementation that is current. Maybe slide 13 really is what you want.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

This is David; I like slide 13 and now that you raised it that way, George, I think that makes it actually tell the story pretty well.

George Cole – Principal Scientist, Community Solutions – Allscripts

Um hmm.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

I sort of missed it the first time through.

George Cole – Principal Scientist, Community Solutions – Allscripts

I did, too.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yeah, I think it might be worthwhile just repeating slide 13 and saying, this is not about meta...a little bit, but it's not about FHIR boosterism for the point of FHIR boosterism, it's about saying that there's an architectural pattern for which FHIR and HTTP are instances.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

And use this as, slide 13 as the abstraction and then you make it concrete in the FHIR era, if we are...

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Right.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

...at the beginning of what would appear to be the FHIR era and how would you flesh this out for the next, I don't know, decade if you think that these things last a decade or thereabouts. Maybe they're probably a decade and a half, but given the slow moving nature of our world, but...our HIT world, but I suspect that speeds up. So FHIR is probably good for a decade and then we'll have something better or at least different, shinier as Shaun might say.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yes.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

We need to keep moving, so Arien, let's go...

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yup, we'll keep going.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

...I think we'll make some of this a little bit more concrete in perhaps a way that will be either clarifying or say reject it, not a good idea.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yup. So David, why don't we switch over to you for the next section.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Okay. Next slide, please. Okay, so what I tried to do with these slides here is come up with what I was calling design patterns, I think we called them architectural patterns earlier in the conversation. I think Janet used the excellent notion of orchestration in her comments, which is very similar to what I'm trying to capture here. So think architecture patterns, design patterns, orchestration patterns as the broad spirit of what I'm going to dive into here. And I'll put it out as it's a notion that makes sense to me in some intuitive way, but I don't know if it's useful, not useful, if it's just slightly off target or it's if it's right on the money. So, I throw it out as straw man to take apart and reassemble as we see fit. Next pattern...next pattern, next slide...we got patterns all over.

So these were some thoughts that emerged from some of our previous discussions, we just brought forward to remind them that things like transport and security are hard to do right therefore you should do them once and reuse them. Health data has a high Pareto distribution in that there's a relatively small amount that's used extremely frequently, so the 80/20 pattern that is guiding some of the FHIR decisions around what's in a core resource and what's left of the extensions. And then the notion that health data moves around in lots of different ways and we want an architectural approach that allows for asynchronous batch kinds of things, real-time things, on-demand things and so forth. This slide probably should have come up earlier, but I put it here just to remind us of sort of what some of the common things that we want to remember and then reuse.

But the next slide gets to where I'm headed. And the thought here is that if we move into this, I'll call it this FHIR era with composable data resources known as FHIR resources and composable APIs which are the HTTP verbs as applied to these FHIR resources, that we might expect to see emerging in future challenges for interoperability, not looking back at the stuff we already do well, but looking forward to the things that are going to come into our radar on the roadmap that we're going to get soon and as we just...as the industry advances and our users expect more and more interoperability. They will see a bunch of recurrent orchestration patterns that we should look to before we design a new spoke interface standard. So what are those patterns and is it worth developing and calling some of them out and maybe giving them a name and putting some analysis behind them.

So for example, one pattern we're going to see a lot of is continuing notion of asynchronous background message passing; it could be streaming or it could be batched. There's plenty of HL7 V2 that's used this way today, thousands and thousands of interfaces working that way; some of those will need to be mapped to FHIR and HTTPS, so maybe there are some patterns there to facilitate that, wherever we feel it might be necessary.

There are remote service invocation patterns in use today, peer-to-peer, peer-to-hub or peer-to-cloud. Most of them, for example like XDS and XCA, are fairly specific, purpose specific. Are there design

patterns here where we could leverage the more generic nature of FHIR and FHIR resources to come up with a design pattern that you say, here's a way to do that to solve, for example, the notion of invoking a remote decision support service by sending the data to the service in the form of a FHIR packet and getting back a critique in the form of a document constructed with FHIR resources. Is that a better pattern than inventing a new Health e-Decisions language for moving data around or for moving rules around?

The middle one there is the one we're going to drill into on the next slide, but for the sake of just listing it here in sort of some notion of increasing complexity, what I call conversational user experience in workflow. This is what the SMART App model is targeting, in my opinion. These could be conversations that are user invoked or that are invoked by some triggering event in the EHR; so some of them are provider asks for the conversation to occur and some of them are conversations that are provided to the provider whether he likes it or not in some way to interrupt his work and say, hey, you need to participate in this conversation.

And I use the phrase conversation here to indicate these are orchestrations where there's a back and forth that may vary highly depending upon what the conversation says and how it flows. So they aren't well captured in static messaging profiles because depending upon what the provider says in response to a question, you may branch in a very different direction before the conversation is finished. So, maybe there's a better term than conversation, interaction or something like that.

Then I think we could get to more sophisticated patterns here for things like background monitoring. Maybe there are going to be in the future common instances where the pattern is, something is listening in the background for something that it's interested in and when that something occurs, it invokes a user conversation and comes to the foreground. We all do that of course internally with our own tools, but if we are to do this with shareable, interoperable services in the future, maybe this is a pattern that we should reuse. Portal-based extensions and smartphone models that take advantage of FHIR and FHIR kind of capabilities are obviously in that space as well. I'm not going to talk much about them right now.

So let me just stop, before we drill into one of these, and I try to make it a little clearer what I mean, does this general notion that these are orchestration patterns that we might want to call to the industry's attention in some way and even maybe give them names, formalize them to some degree as patterns. In other words, they're not solving a specific use case, but they are a pattern that you'd go to the shelf and say, ah ha, this pattern is a good way for me to attack this use case rather than inventing something that no one's ever seen before. Am I completely off base or does that make sense?

Janet Campbell – Software Developer – EPIC Systems

The background...this is Janet; the background monitoring with pop-up UX, is that...what we're talking about there is like either an observer pattern or a watcher pattern, right?

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah, it would be...

Janet Campbell – Software Developer – EPIC Systems

Okay.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

...an example of that scaled up for the world that we live in using FHIR and FHIR resources. So imagine that someone has a service that is designed to assist providers in ordering more appropriate tests and you want to be monitoring for the test orders that are being generated to see whether or not it's time to interject and pop something up. It could be that that's a pattern that gets done in an interoperable way so that a shared service could be used by different implementations. It might not...

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

My favorite example...this is Arien; is the e...is the CDC public health monitoring App where it might be Ebola today, it might be hantavirus tomorrow; you can't fully constrain the decision support App and you can't fully constrain, as CDC has tried to do, the CDA packet because you literally don't know what the disease of the week is going to be.

Janet Campbell – Software Developer – EPIC Systems

I was thinking maybe what might be useful with this as we continue to develop it...where there are obvious I guess ties back to more classical design patterns, using those names there, when we can, unless it doesn't make sense.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

No Janet, that's a great idea. I did...it did not occur to me to do that, I will look to my...those of you who are...

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Look to your fouler in a game of four.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

I haven't read those books recently enough to know all the current patterns, but I'm absolutely trying to leverage some of those well-known patterns and would not be ashamed that if in healthcare or in this higher level orchestration world, we need new patterns. We may want to give...I mean, the SMART platform, for example, maybe that's just called SMART platform pattern because there's a certain orchestration hand-off there that involves quite a bit of complexity and we can give it a new name, if we want to.

Janet Campbell – Software Developer – EPIC Systems

Yeah and I should say, I really like this, by the way, I just...I forgot to say that part, but this is good.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Oh good, glad to hear that because I'm nervous when I'm talking this through. Let me go to the next slide and drill in on the SMART workflow as an example. So, I think you all know how this works well, Josh who kind of invented it should be doing this, but I'll just describe it to say that it's the ability to put conversational user interaction in or near the provider's workflow, implying by that some kind of context about what the provider's currently doing and it uses the building blocks of HTML 5 for the user experience itself, it uses FHIR for the data service, could be read or could be write, and it uses OAuth 2 and OpenID Connect for the authorization to access the data services. And there's also an emerging notion of a standard way to pass context so that the workflow constructs of the provider's world when this thing happens are passed into the App so the App can make smart decisions about how to engage the provider.

So...hand on a second, my computer just locked me out, now I'm back. Okay, so what I've...with this pattern in mind, I've stumbled across a number of use cases that are either in process or have recently emerged or that need to be designed for which this pattern seems to me to be a very applicable solution. And yet in almost all of those other cases, people are starting from scratch and building new things that for the vendor world, would be harder to implement, I would propose, than implementing this generic pattern and then crafting specifics around the details.

So for example, the CDC interventions around Ebola screening that Arien just mentioned, that's there in the middle of my list, but I'll just jump to that one because Arien mentioned it. The way you could envision this working is that the vendor would be asked to implement a trigger rule that detects when some specified set of things happen. That pops up an App that then engages a CDC supplied conversation asking for additional questions and perhaps giving you the latest and greatest recommendations on what the preferred treatment or isolation protocols would be. You could make that more automatic with a background monitoring App, that would be a more complex pattern, but you could start with this decomposition that says the vendor will do the triggering work against a published specification and then the CDC will give you an updated conversation.

The number two there, the prior approval and appropriateness conversation; I think most of you are probably aware that CMS has declared that they're not going to pay for any radiology studies after some date in 2017 unless the order carries with it proof that an appropriateness screen was performed. Now, there are teams out there trying to invent APIs and interfaces and complex negotiations between systems to implement appropriateness screening for radiology orders. It seems to me that this pattern would fit that case pretty well.

You have to figure out at the vendor level how to trigger the conversation, you would invoke an appropriateness screening company's logic and then when that...and a provider would answer whatever questions couldn't be pulled out of the record using FHIR. And when it's done, you have to leave something behind that can go with the order so that the claim has the right proof token in it; that would be work that has to be negotiated for that particular use case. But the vast majority of the code, from the vendor point of view, would just be another iteration of this common pattern.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

And this is Arien; the great thing about that is that the next time you want to do it for ICU versus step-down or for home versus home health versus SNF, kind of the same thing.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah, so let me stop there and just say does this resonate Josh? Am I describing the world that you've been working so hard on? Is this consistent with the way you see these tools emerging? Maybe we lost Josh.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Or that's the mute button that he hasn't pushed.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

We probably bored him to death. George? Janet?

George Cole – Principal Scientist, Community Solutions – Allscripts

Yeah George while you're waiting on Josh. On this slide that we're looking at, actually, I need to make sure I'm looking at the same slide you are.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Twenty.

George Cole – Principal Scientist, Community Solutions – Allscripts

I was a slide ahead. Sorry. I did have a comment on the previous slide, on the patterns.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah.

George Cole – Principal Scientist, Community Solutions – Allscripts

I love the list, especially the first four. I think I am going to need some more conversations and discussions and maybe I can almost believe portal Apps are a pattern, but I'm not sure smartphone Apps are a pattern or are they an implementation of maybe a host of patterns, just...

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah...this is David again. Good question George and I ran quickly by that one because of the complexity and I wanted one that was a little bit maybe more concrete and close to hand. But what I meant by putting that there was, you can imagine in the future, I mean, I think it's a future that's rapidly closing in on us, a variety of Smart Apps that need to have access to the patient's data through the patient's account on the portal and to do so, they'll need to be a handshake with some kind of version and variation of OAuth to identify that the consumer has rights to see that data, that it's their data and then a handshake around passing context from a smartphone into the portal so that the portal knows is it the patient or is it the patient's child, etcetera.

George Cole – Principal Scientist, Community Solutions – Allscripts

Uh huh.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

And then that could become a common pattern that gets published and App developers say, we'll use that as our starting point.

George Cole – Principal Scientist, Community Solutions – Allscripts

Actually I thought you were going to take this in the direction of the Internet of everything and say, we're going to have smart lots of things, which would become a pattern in healthcare.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Well...

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

That actually might be an interesting discussion, right? So there's the...there is something, I think there is a pattern of pluggable patient thing that accesses the patient's record.

George Cole – Principal Scientist, Community Solutions – Allscripts

There may be.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

And whether it's mobile or web or head lists or Smart Scale, probably is but don't care.

George Cole – Principal Scientist, Community Solutions – Allscripts

Sure. Right.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

The other example I didn't drill into was the structured data capture one, which is bullet point number what, 5 there. When I first heard about that initiative, this is an S&I Framework initiative that got launched a couple of years ago, and read the materials, I was kind of stunned to see that they were going to propose the creation of a brand new, incredibly complex forms definition language which had support from exactly one vendor in the whole world, that the EHR vendors would all be expected to implement, from scratch, a new forms engine in their EHRs in order to capture some data for a particular use case, a research study or whatever.

And it struck me and Stan and Josh, when I shared it with them, that that was crazy complicated when all you really need to be able to do is to push an HTML form, using whatever tools in HTML as your favorite way to capture data from a user, touch, voice, drag and drop, you name it, into the provider's workflow and that what the standardization work ought to be on is what are the data elements that you need to move back and forth with FHIR. And if they don't exist in FHIR's current repertoire of resources and existing profiles, then put your energy into proposing new resources and new profiles. And that just seemed to me to be a perfect example of a place where a much more powerful, simple, extensible, orthogonal pattern could solve that problem and many other problems with much less work on everybody's part. So...

George Cole – Principal Scientist, Community Solutions – Allscripts

Yup, I was a part of that group and the ISO standard for that forms definition I think was a special agenda...

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah.

George Cole – Principal Scientist, Community Solutions – Allscripts

...rather than...yeah.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah and it's just not...you can accomplish the ends of that group with much less effort. Anyway, so let's go to the next slide and...

Joshua C. Mandel, MD, SB – Research Scientist – Boston Children's Hospital

One comment, this is Josh if I'm audible now.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah, hi Josh, welcome back.

Joshua C. Mandel, MD, SB – Research Scientist – Boston Children's Hospital

Thank you. My main comment is that I wasn't bored and no amount of fiddling with my mute switch allowed me to talk, so I had to hang up and dial back in. But yes, David, it's always delightful hearing you

describe the power of this technology and very much aligns with the way that we looked at, the way that applications can plug in to get data in a generic kind of pattern. And I really like especially the way that you talk about separating out triggering this application launch, we don't have to standardize everything at once. If some of the triggering happens manually out front and over time we start to understand what are the reusable use cases for triggering applications, then we can start to standardize how that happens, once we've learned from it. I think it's a really nice pattern.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Well good, I'm glad I didn't mangle much of what I've learned from listening to your thoughts on the subject. Let me go to the next slide and just walk through one more slightly concrete notion here. So, I put this slide together for internal use and to try to explain SMART and FHIR to my colleagues here at Cerner and to other groups that I've presented to and so it's not necessarily completely current. I think there are some changes that are emerging in the way we're going to use OAuth and pass context around.

But what I would propose as our notion here, out of our little architecture API group is that instead of the sequence diagrams that litter our existing standards, all of which are necessary but all of which are idiosyncratic to the standard, to the particular interface being described. Maybe we could come up with sequence diagrams like this that capture some of these core patterns or core orchestrations, I think Janet's word is best, and then when you have a new interface problem, a new usability or...not usability, a new interoperability challenge in front of you, you go to a library of these patterns and say, okay, this looks like an instance of the conversational app in workflow pattern. Let's plug in the details that make this use case an instance of that broader pattern.

So in this slide, just crudely, it separates out the roles of the EHR, which is sort of the workflow tool; the SMART container which is the place where the App is hosted. The SMART App itself who has to redirect to an authorization service, which is here sort of notionally OAuth 2 plus or minus whatever gets added in terms of user managed access and some of the other things that are being debated. That returns a token to the SMART App which can then use that as a key to go get the data from the EHR as a FHIR Service, which is...could be on the other side of the drawing, but it made my lines more complicated so I pushed it over to the right there.

And technically the FHIR Service doesn't...it could be coming from anywhere, as long as you have authorized access to it. And then you have an HTML conversation that moves data back and forth using HTML and JavaScript and then finally the App is done and the user remains...regains control. So, is that...does it make sense that there could be a library of these that emerge in the FHIR, OAuth era that could be developed by us or by an S&I group or...

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

David, one friendly amendment...

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

...because I think in terms of the previous discussion that we had, I think we should be thinking in terms of reusable interoperability design patterns and then specialize them to FHIR and OAuth and HTML 5 and the like.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah, okay. Yeah, I mean, absolutely. I'm...I think concretely but I can be forced to abstract.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yeah, I go the other way, so, we're useful foils.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah. Yeah. Either this is blatantly obvious or it's totally off-base; probably...there's probably not a lot of refinement, either it's a useful idea or it's just completely idiotic.

Joshua C. Mandel, MD, SB – Research Scientist – Boston Children's Hospital

So this...

Janet Campbell – Software Developer – EPIC Systems

You know, I really like what we've been doing here. I think the only challenge that we'll have is that sometimes when you have a library of design patterns, it seems pretty easy to...you can fit and stretch and mess this one up and that might actually have been kind of what happened with RFD, but speaking as the one vendor who does it and doesn't like it. But I think as long as we're sort of careful about not having...I guess having that flexibility or having the caveats around it sort of that the places where a certain profile may not work as well for, some of the guiding principles of how you don't use a design pattern, I think that would help round out the picture.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah, that's a good point. I mean, my thought here is...what my experience has been in a number of conversations where I've been parachuted in and I listen to what's being planned and I say, wait a minute, I think there might be a more generic way to solve this problem and I present something like this, and the conversation changes to say, yeah, let's see if we can fit it into that more generic way. I'm trying to encapsulate that experience so that I don't have to parachute in and explain it, or send Josh to them to explain it or send Janet to them to explain it.

Janet Campbell – Software Developer – EPIC Systems

Maybe that could be our design pattern, we just have an Oracle at Delphi who would just listen to all the...

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah or maybe...

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yeah, just pay me enough money and I'll just do that that will be my job.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

I was going to say, maybe it's a little consulting group we could form right here. We can monetize all these hours.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Michelle, can you make that happen for us?

Michelle Consolazio, MPA – Federal Advisory Committee Program Lead – Office of the National Coordinator for Health Information Technology

For free.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Oh that's right, you get it for free, don't you. Damn you ONC.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

That's part of the good news. And I think that some of this is happening with some of us, Janet I know you and Josh are both involved with HSPC, George, I think Allscripts is involved with that at some degree as well. So there are groups out there that are working on this kind of an idea and this is obviously much better done by a group that has a devoted membership that wants to go and churn these things out.

But it would be nice, I think, if we could take the message back to the Standards Committee and maybe the broader community that we endorse this approach, put some exemplars out there of this is what we're talking about, here's an example of what we're talking about; if that makes sense. Maybe we can go through what comes out in the Interoperability Roadmap and try to apply some of these patterns to that roadmap and suggest that some of the stuff that's queued out there for the future could be instances where we can go experiment; does this work in the real world?

Joshua C. Mandel, MD, SB – Research Scientist – Boston Children's Hospital

So this is Josh, I would say I think the notion of recognizing patterns that are useful and that can encompass lots of use cases is really valuable. I would be a little bit hesitant to endorse the notion that we should go ahead and try to compile a big library of these; the risk becomes that we're compiling them for their own sake rather than because we're actually discovering and using these patterns in the course of getting business done every day. The idea that ONC is going to convene the group that's going to define these patterns I think worries me a little bit as opposed to defining a group to recognize patterns that are out there and that have been established.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

This is Arien; I wonder, just previous to our...or wonder relative to our previous discussion, whether some of the S&I Framework and other kinds of activities that we know are under way, if we can maybe do some more focused work and generalize those to at least the pluggable App pattern; but...as maybe a more focused way of getting this job done.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

My c...this is David; my concern has been that people haven't heard of this way of thinking. Now, maybe that's just...it just takes time for technology ideas to disseminate but Josh I understand the concern to not overly prescribe stuff based on abstractions that may not actually have real world use, that we don't want to make those mistakes if we can. On the other hand...we had official projects underway well down their path that were going the wrong way and how do we get people aware of better choices, better approaches, more powerful approaches? How do you...those ideas?

Joshua C. Mandel, MD, SB – Research Scientist – Boston Children's Hospital

This is Josh; I totally agree with the notion that we should be evangelizing patterns that we already recognize as broadly useful and that we're already using within our organizations. The area where I was pushing back, I think, was about trying to compile a library of these things sort of prospectively.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

I think that's the nature of my comment as well is that I think we can show how a bunch of different things that have been discussed get reduced to a common pattern and that's very different from proposing the universal set of all patterns.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Other comments? I've done too much talking. So I'll...all right, in absence of other ones then...well, I'm...I certainly think that it's okay not to come out of here with a recommendation that we build a library, but it would be interesting to speculate about the best way to identify the emergent patterns and get them into widespread discussion as they're emerging, so that we speed up the process of getting consensus around those patterns involving real problems.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Right. Can we reduce...can we reduce radiology decision support, Ebola detection, etcetera to just do this?

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah or, and I'm thinking that the SMART App world is growing rapidly and the...with the ability of something like FHIR to make it fairly straightforward for an App developer who doesn't know anything about the V3 RIM, but knows that they need some lab data from their user's patient record, they're going to want to go access those records and we're going to see an explosion of different ways of doing that that absent some gentle nudging, are probably not going to follow similar design patterns.

I mean, they'll be close, but they'll use different variations of OAuth or they'll use different ways of locating the FHIR end points URI. And so maybe there's...there could be a beneficial contribution to get those conversations going in a place or in a mode where we can get rapid consensus and we get to interoperability and interchangeability faster than would happen otherwise. I mean I'm...it will happen one way or the other, the question is, is there a channel that we could use with the hats that we're wearing in this call anyway, to make that happen.

Or maybe it should be other hats, the HSPC call later this afternoon that some of us are going to be on may be a better channel for this kind of work. Or IHE or HL7 PCC, I'm not sure where it occurs. Maybe Josh it's through the mechanisms and conversational platform that you set up through the SMART Platform group. Or maybe we just don't know.

George Cole – Principal Scientist, Community Solutions – Allscripts

David, it's...

Joshua C. Mandel, MD, SB – Research Scientist – Boston Children's Hospital

Yeah, I mean one question for...sorry, go ahead.

George Cole – Principal Scientist, Community Solutions – Allscripts

Go ahead, Josh.

Joshua C. Mandel, MD, SB – Research Scientist – Boston Children's Hospital

This is Josh. One question I was going to say, from our perspective giving advice to ONC is at what point in this arc of recognizing patterns and evangelizing them and implementing them in the real world; at

what point does it make sense to think about standardizing them and endorsing them at a national level? And that's not clear to me at all.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

And I think that's what I was...this is Arien; I think that's what I was aiming at is that this won't...unless we can say we recommend that ONC funnel these kinds of things that want to happen into this pattern, it's not clear that we're actually fulfilling our advisory role.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah and Josh, just...as you well know, the place where the rubber hits the road is the certification impact that the government does have on our world. And just because we don't like...well, that's the wrong way to say it, let me say it as a positive, maybe by judicious advocacy of some of these powerful and generic patterns, we can get better expectations that we have to then go certify against than if we left it up to whatever emerged from whatever workgroup gets anointed to go design the work.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yeah, this is Arien; I think that's actually a really nice frame and we can use this framework and the notion of reusable patterns in the context of the Interoperability Roadmap, but even more precisely in the context of the proposed certification criteria in the edition 2015 rule, as our first exercise in applying the framework and the patterns.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah, that's the extent to which we should do it. I mean, I totally agree we don't need a new government body that's designing orchestration patterns for use of FHIR as a new government office. But to the degree that there is an interoperability mandate on ONC that affects its...that carries out its power through the certification standards that the vendors essentially are required to implement if they want to stay in business, there is...there are better choices and worse choices and the degree to which good design patterns can influence and lead to better choices, I think there's an avenue for fruitful...for us to do something useful.

Again, I'm not sure what channel; I think the whole notion of the S&I Framework is under review, Arien actually is leading...co-chairing the task force that's looking at that. Maybe some of this could fit into your task force, thoughts, Arien around...

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Well no, we're not trying...we're trying to solve the problem of what are the pre-conditions...what does the S&I...what is something that's S&I-like good for and what are the pre-conditions for working on something and what are the...what's the process that something S&I-like should follow in order to succeed. I think that's separate from the notion of, what kinds of design patterns should be applied to a putative S&I initiative.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah, not so much...yeah, I was thinking a little bit, believe it or not, more generic than that or abstract than that, than just the notion that, you know...

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yes an S&I initiative should...

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yes.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

...we recommend that an S&I initiative should apply a well-recognized set of design principles, yup.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Either seeks to identify an existing pattern or to craft and publish for review a new pattern...

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Fair point.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

...again, speaking along the lines of leverage the composability of the core capabilities that we're all going to build out with FHIR and FHIR profiles and OAuth 2 and OpenID Connect and the things like that. So given that those are our modular building blocks, put your patterns together with those things in mind because that's going to be the least intrusive, most likely to succeed way that we get desired outcome.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Fair point. Okay, I notice we're 9 minutes until the close. We should do maybe a last round of comments and then go to public comment.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Suits me.

Janet Campbell – Software Developer – EPIC Systems

So I guess, where did we land?

George Cole – Principal Scientist, Community Solutions – Allscripts

I'll give one more comment on the patterns. I kind of think that we should keep the idea in this group that maybe there is a small set that we would find very useful as evaluation criteria, as recommendations. David, I think the first four on your list may be renamed in terms of comp sci accepted names or something, but I think this is part of our charter and I think to try to expect groups like IHE or HL7 workgroups that are very detail and implementation oriented to pick up on this idea without guidance from a group like this is something that would not happen. So, I'd like to see us continue to discuss this and kick it around at the pattern level.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

George, this is Arien; can we ask you to do some thinking and maybe propose back to this group some patterns?

George Cole – Principal Scientist, Community Solutions – Allscripts

Yeah, I'll take that.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Okay. And then Janet, I think to your question, I think we agreed, or maybe we proposed and maybe we just need to either agree or disagree, that we are going to seek to apply the framework and putative

patterns to both the Interoperability Workgroup or the Interoperability Roadmap and the certification criteria that we're tasked to review for the next forever.

Janet Campbell – Software Developer – EPIC Systems

Got it.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah, for the next forever, okay. Yeah, I'm comfortable with that that we're going to go test some of these ideas on concrete proposals, some of which we'll just say, this is an extant approach that's already been deployed and just needs to be tweaked; we're not going to go and retrofit. But there may be some new things out there in years 3, 7 and 10 or whatever the benchmarks are, to say maybe let's see which of our putative patterns might be most applicable and if we can come up with some that seem to show up over and over again, maybe it's a worthy idea to give them a name and refine them a little bit.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Yup.

Janet Campbell – Software Developer – EPIC Systems

Can we make some punitive patterns, too?

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Punitive patterns would be good, too.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Yeah, yeah. Okay, maybe public comment if anyone has hung on for Michelle.

Public Comment

Michelle Consolazio, MPA – Federal Advisory Committee Program Lead – Office of the National Coordinator for Health Information Technology

Operator, can you please open the lines?

Caitlin Collins – Junior Project Manager – Altarum Institute

If you are listening via your computer speakers you may dial 1-877-705-2976 and press *1 to be placed in the comment queue. If you are on the phone and would like to make a public comment, please press *1 at this time.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

We got them with abstraction.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Everybody's at a Connectathon or something I think.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

That's true as well.

Michelle Consolazio, MPA – Federal Advisory Committee Program Lead – Office of the National Coordinator for Health Information Technology

There are no public comments at this time.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

All right, well until next time when we have some additional work to do.

Michelle Consolazio, MPA – Federal Advisory Committee Program Lead – Office of the National Coordinator for Health Information Technology

Thank you all.

Janet Campbell – Software Developer – EPIC Systems

Thanks.

Joshua C. Mandel, MD, SB – Research Scientist – Boston Children’s Hospital

Take care...

George Cole – Principal Scientist, Community Solutions – Allscripts

Thank you, good meeting. Bye, bye.

David McCallie, Jr., MD – Senior Vice President, Medical Informatics – Cerner Corporation

Good conversation.

Arien Malec – Vice President Strategy & Product Marketing – RelayHealth Corporation

Thanks.

Public Comment Received During the Meeting

1. +1 for that *IoT pattern
2. What exactly are the differences between the types of patterns proposed by this workgroup and those proposed by IHE? (<http://wiki.ihe.net/index.php?title=Profiles>)
3. Could I be emailed back with a response at vineeth.gangaram@gmail.com
4. The dial - in bridge for public comment is not working - Tried 3X now
5. Troubleshooting info: spk to op, op says "I'll connect you now," then silence, then line is dropped on the remote end