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Alastair MacIntosh (City of Lincoln Council)

Well, it's great to see so many of you here. This is quite a remarkable turn out. I think it's approaching some of the smaller HER Forum meetings. Welcome to this Archers UK user group meeting. As I think many of you will know, it's not solely for HERs, we hope to be a welcoming place for anyone based in the UK who's using the Arches platform. We've had a couple of meetings so far, but I think we've been somewhat patchy and now provision.

00:00:50:00

And now that I think just before we continue, I know it's not on the agenda Stu, but I think this is probably the time to sort of say that I think being chair of this is something that I don't think I'm really bringing my best game too, so I think it's probably about time that I resigned in favour of someone who might well be able to give it more attention. And I'm thinking that I'd quite like to nominate Stu for that. If he doesn't object horribly. Smile Stu.

Stuart Cakebread (Historic England)

Yeah, and that's OK.

Alastair MacIntosh (City of Lincoln Council)

So that being the case, I mean, there's an awful lot of you here, and only some of you are on the screen, so does anybody else want the job or want to nominate someone for the job? Looks very much Stu, very much as though you're in the frame so.

Stuart Cakebread (Historic England)

I have all my arguments worked out in case it's gonna, you know, go down to a battle.

Alastair MacIntosh (City of Lincoln Council)

Uh, so I think we can, we can then say that the torch is passed to Stuart Cakebread. Congratulations, Mr. Chairman.

Stuart Cakebread (Historic England)

Thank you very much. Thank you.

Alastair MacIntosh (City of Lincoln Council)

So do you want me to just carry on introducing the agenda for this meeting or I think I think you should do it- Stu, actually I think.

Stuart Cakebread (Historic England)

No, no, no, no, you, this is your last one. Go out with a flourish. Mac, go out with a flourish.

Alastair MacIntosh (City of Lincoln Council)

Last of three. Okie dokie well I think I think in that case we should probably get straight on into the presentation. Let's just to just sort of say- there being so many of us. If we can save questions until after the sort of presentation has finished and then, umm, then we can sort of have the presentation and

question sessions differentiated for the benefit of the transcript and for people sort of coming in later on. And I think that's probably the best way to arrange it. So after each presentation, we'll have a bit of time for questions. It looks like we've got a good three-hour session. So hopefully we'll have plenty of time for all questions to be asked and answered.

So I think, umm, let's start off by having the first presentation on the Mapping Archaeological Heritage in South Asia project by Azadeh and Junaid. If you'd like to take it away.

00:03:14:03

Azadeh Vafadari (MAHSA)

Yes, thanks. Thanks Mac and hello to all. And thanks to Stu and Mac for organizing this session. So let me just start to share my screen first.

Yes, great. So Junaid and I. Umm, thought to talk to uh to you today about more the process of our data development and how we prepare data to go into Arches. So not focusing on Arches itself but kind of the development stage of the process and just to quickly, for those who don't know our project, just to quickly to introduce our project and Mapping Archaeological Heritage in South Asia (MAHSA) collaborate with local stakeholders in India and Pakistan, and we use different methods and historical maps, legacy data and machine learning and ground truthing field working survey and etc to identify, document and disseminate archaeology and cultural heritage of the Indus Valley Basin and the surrounding areas. And the main reason that we're doing this, as many of the other Arcadia projects using Arches, is because the heritage and archaeology of this region is at risk of increased agricultural and urban expansion in the last 50-60 years, and this is an example that you can see from amount settlement sites, that was identified both in the legacy data, existing publications, and documented on historical maps, but half of the sites have has been leveled and this has been happening to a lot of these sites. And one of the - the main aim of the project is to document these sites and make them available in the Arches platform to help other heritage professionals, researchers and public with specific access requirements to have access to this data.

And we are using different sources of data. The data that we're using for the project, it comes from different sources and from the beginning we started to think about these different data and all the attributes that we have – to understand how to better design Arches database, so quickly to introduce the different sources of data that we're using: one main one for us is a historical maps specifically survey of India maps and these maps where implemented as part of the British colonial interest in the region, let's say, and this maps documents features on the landscapes in different scales (one inch to one mile and also one inch to two and to four miles). But the one inch to one mile map series were based on topographic surveys from the late mid-19th centuries and the resulting maps where produced from the first half of the 20th centuries. The map of this series, specifically the one-to-one inch map, they're very useful for remote sensing, and they were created using systematic in a large scale. Let's say, I'm doing a systematic scale and contains many details of features that are important for us as archaeologists. There are also archaeological sites that there are documented on these maps. One feature other than things features like mosques or temples or more like heritage features that mark on the maps, there are also different iconography that's used to document elevated grounds or mounds on these maps. And we're using - based on the different previous studies that were undertaken by our collaborators in India and also the Cambridge researchers, it was identified that a lot of these mound features from these maps are archaeology.

In this kind of two small screenshots that I have here, these are the two different mounds that we can find from these maps; they are short mounds and the form line mounds that sometimes they might have also other indications like crosses for abandoned settlements or the temples that they're identified on top of these mounds. So one kind of the source of data that we use a lot are the maps. And we're also using remote sensing today satellite imagery to see whether the mounds already exist by looking at the imagery or, like this, they're leveled. Another kind of the big source of information for us or the legacy data or existing published data. And these sites are coming either from different books or published survey reports and PhD and Master's thesis and they've been documented in different hard or soft copies and in different formats. And, umm, we have them mostly combined now - compiled in one, again the previous projects before MAHSA started in - I'm trying to remember the, what was it, Junaid, can you remind me the name of the database that was used - Maybe you're not here, Junaid...

Junaid Abdul Jabbar (MAHSA)

Yeah. Yeah, I'm here. Sorry. Which the I can't database [INAUDIBLE] FileMaker Pro.

Azadeh Vafadari (MAHSA)

The previous [INAUDIBLE] yes, our FileMaker Pro. The name was kind of skipping my head. So the data was kind of compiled in FileMaker Pro and then it was - the first stage of the cleaning that Junaid started with the project, we ended up with, more or less, around 10,000 sites that now we had to enhance and clean before pushing into Arches. Then we are using machine learning and a trained model to automatically detect these mounds from the maps and with the first kind of series of this type of detection, a trained model was applied over an area of 470,500 square kilometers and we have now around 6,000 mounds identified. But by these maps, again, we don't know if there are archaeology or non-archaeology, but kind of the kind of as a as a data that comes, let's say, from these maps that we have now around 6,000 mounds for now and they're going to increase. We need to also study and include in the database. Then we have a field survey components that when we - we work very closely with our collaborators in both India and Pakistan. Based on the post legacy data that we have and the mounds that they are identified by the maps, our collaborators identified different areas for field survey and identify the features that they're interested to go and see in the field whether there are archaeology or not, and if there are, to add anymore information that they can from the field to these sites. So when we were thinking about modeling this data into Arches, when we were having these kind of sources first that we wanted to be able to capture and include in the database and with that we decided to make two different resource models for our data sources. One is the information resource model that comes with Arches database, but we modified it to meet our purpose kind of based on the information that we want to record from our sources. And these are everything from books, articles, videos, photographs or anything that we use as source to find to record archaeology from. But because we're - our main source is historical maps and recording a lot of metadata for these maps and not just the things that they're more interested and imported on archaeology side but on the history side of the maps as well, we decided that we need to have this separate resource model for historical maps as well. And then for our archaeology heritage sites, we decided to have two resource models. One is the one that we call 'heritage location' and that's mainly for most of the sites or heritage features that we're recording in the database. But because we're also dealing with a few very complex sites, whether they're serial sites or very large sites that they're in two different districts or provinces of 1 country, we wanted to kind of have this separate area, heritage area and resource model, to be able to deal with the more complex sites.

And then, of course, where what is the activity that this data is coming from? So if we're doing remote sensing or field survey, these are recorded in our activity resource models and then we have a few more for the grids and personal organizations that Junaid can show you if you're more interested in seeing our

different resource models. For the database objectives, the Arches end result objectives, we wanted of course to address this key issue of data accessibility. We had all this data living in different closed, either databases as a data sets or hard copy ones, published, but hard copy. So far our main aim was to make this data accessible. But then we had to deal also with the issue of compiling clean data and dealing with the inconsistencies and imprecisions and duplications. As you can see from this, this is just a few examples, but we have many and many of these examples that one site in in the existing format of the GIS layer that we have, they have multiple locations. We have one multiple locations from one site. Or a site might have different names. So we wanted to, before pushing things into Arches, make sure that we clean and enhance data.

That was the stage that we started to think about so how we can do this and we wanted to be able to visually analyze this data. We had to use GIS and we want everything to be, our partners and collaborators in both India and Pakistan, be able to use freely. So we're relying on open software and we're using Quantum GIS. We wanted to streamline this process of cleaning, enhancing data in a GIS environment and also not to duplicate our work. We thought from the beginning to use maybe a geopackage format but then moved into using a more – a database that Junaid is gonna talk about as an interim phase, to our different research associates and be able to use at the same time, same database, clean data, be able to do this analysis in a GIS platform and then push everything, the clean, as much as we can do the clean and enhanced data into Arches. And this is where I'm gonna hand over to Junaid to continue and explain this data development process and data life cycle.

Junaid, would you like me to continue and go forward or you want me to come out and use screen share your screen-

Junaid Abdul Jabbar (MAHSA)

Yeah, yeah, I can share my screen, if that's OK. Yeah.

So yeah, as Azhadeh talked about the different steps of the data development that we are having at the MAHSA project. So over here I'll talk about the different data development tools that we are using to digitize the data to manage it and then import it into Arches. So on the top row, this is the diagram that we are using for data lifecycle for the MAHSA project. So on the top where you can see the summary of the sources that is Azadeh has already discussed and that we're using historical maps, a collection of legacy data, remote sensing Google Earth images that, imagery then data is coming from machine learning and the digital field service using the OTK app. So all those data that is there mentioned we were dealing, we are dealing with the quite complex data set in terms of the duplication of the data and also the locational variability. For example in some of the data sources and some of the site locations, that there are up to four, five or six different locations that are coming from different like data sources which really presented the need of visualizing this data into a GIS environment, which is QGIS for us and to create that link between the spatial and nonspatial attributes so that the team could develop the data in an organized way which can be eventually imported into Arches.

So over here you see two parts, one is the centralized data development and the second is the decentralized data development. First I will talk about the centralized setup that we have, so this setup was mainly developed and put in place to handle all of those requirements of handling the error duplication issues, working in QGIS to cater for the locational variability, do the different types of data analysis using satellite imagery that base maps so this centralized database can be connected to QGIS and we have made a data entry form that I will talk about in the next slide to enter data into the centralized database.

However, at the same time, we cannot totally get rid of that decentralized data development because we have collaborators in Pakistan and India. We also have a maritime branch of the project. So in that domain we have data submissions coming from the digital field service using the OD application. And then there are also structured CSV files that basically depict the bulk import templates as mentioned in the documentation. We are not using the relational geopackage extensively at the time, but this is mentioned over here as a possibility for future. The rest of the data is managed onto the SharePoint and we have quality assurance and formatting checkpoints between our collaborators and MAHSA team. So different team members from the MAHSA team are responsible for different regions across the project area and the collaborators within then prospective area submit the data to the respective where team member from MAHSA who makes sure that it's correct in format and performs a quality assurance. From there it becomes a part of one centralized PostgreSQL database, which from where it's pulled into Arches and an automated scheduled pipeline that I'll talk about in the next few slides.

Uh, so this is the interface of the form that you can see that we are using to enter data into the centralized database. I would like to thank the CAAL project and especially Marco who was very kind enough to have a number of sessions with us in the beginning to share their work about this geopackage and data entry form. This form has a number of features implemented in it, like it ensures that the MAHSA remain unique so that there is no duplication and the data imports fine in Arches. Then handling one to many relationships like all those branches that are configured to allow multiple the notches are handled using the one to many relationships in different cards. As you can see on the top of this interface-like assessment activity, site name- summary. Then we have the drop downs for control vocabularies and on the left hand side, we have, just because there are a number of tables due to the complexity of the resource model. But we - we have marked the other table that's hidden so that they don't confuse the [INAUDIBLE] team and you can only see the heritage location layer point and the geometry layers had to be kept within the project so that it can be visualized on the map part of the QGIS.

In this screen you can see that one heritage location can have more than one assessment activities. So where you can enable started reading for the assessment activity and start adding more than one assessment activity using the one to many relationship. Here is an example on the - for the concepts dropdown we have added the control vocabularies from our thesauri into this form and over here you can see that this assessment type is a concept list. So you can select multiple values from the entry form. The next step when you have data into the centralized database, the next step is really to import this into Arches and some from the very beginning, because of the project requirement, we had a big complex resource model with nested multiples. So we were having challenges with importing this data using the CSV file. So if you look at the example of this nested multiple, that one heritage location resource can have multiple condition assessments and then one condition assessment can have multiple disturbance or damage so there is a risk assessment. So this was increasing the number of nested multiples and giving us a challenge in terms of data importing the CSV file. So we discussed this with the different projects, how they handling custom solutions in place.

And then in discussion with Farallon, we came to know about that there is a relational schema functionality of Arches that will be rolled out with Arches 7 that would allow you to just deal with your data in terms of relational views. So we have extensively worked on that to be able to import our data into Arches. What this functionality does is that it basically creates relational schema for your resource models. Over here you can see that there is a function Arches created resource model views. You pass the relevant graph ID, remember this is the graph ID for our heritage education resource model. It gives you a success statement and on the left hand side you can see that it has created relational views for all the branches in your resource model. Now it gives you a lot more control of your data, how you do the

parent child hierarchy to import your data in in the right way, and at the bottom, at the right you can see that the individual columns that within these views, like you have to populate the tile ID and then populate the actual address direction string, then the concept for address direction type, then the resource instance ID and so on. So you have to basically write the actual SQL queries to pull the data, to insert data into these relational views. What we have done is that our centralized database is accessible from within the Arches backend Postgres using the foreign functionality of Postgres. So what I'm doing is that we are directly accessing our centralized database from Postgres, from Arches backend Postgres. The queries to insert the data would look something like this, so over here you can see the example of importing the name data for name branch - over here it's because in the Arches backend, we need the UUID for concepts rather than the exact concept. For example, if the name time is primary, you need to replace it with the unique Universal ID from thesauri. So which statements allow you to create a lookup table just for the scope of that query which replaces their concepts in the relevant UUID, and then you write the rest of the query for importing tile ID, name, type name and the resources test. One thing that is important with Arches is that the data types for Postgres columns has been changed to json, to jsonb. It had to be able to cater for multiple multilingual strings in the same cell.

So over here you need to convert that value of your name into adjacent object as you can see in the line number 2 Just as I mentioned about the concept column, similarly there is also – you can also have concept list within your resource model. When we were working with it, we noticed that there is no in the documentation available and the functions that are available. In the documentation for this relational schema, we don't have the provision of importing the concept list data, so we were talking with different developers with Farallon, and we have written our own custom function that expects the data in this format like just a standard concept list that for example at the bottom you can see for further bibliographic research, ground truthing, location accuracy, are different concepts in a concept list. This would go into this custom function that we have written and it generates an array UUIDs that is acceptable for Arches relational views. So we are happy to share with any other project that wants to make use of it. But yeah, I have also shared it with the Farallon contact person that I was discussing it with, so it might become a part of the documentation eventually.

Some of the challenges: after doing this import into the relational views, you just have to run the indexing command and your data would be readily available into Arches. Some of the challenges that we had while working this pipeline out is that the documentation for there- is limited documentation available for different RC data types and how they would go into the json, into the Postgres json binary structure. For example, we had to insert for some cases like the URL node, we had to insert the data directly from the Arches interface and then go to the backend and see how it would look in the relational view and then write our SQL query according to it. Similarly for the DTF and then the concept list function that I've mentioned, so this took some time to sort out. Currently I have posted this on the forum as well that there is a challenge of handling null geometries. So what is happening at the moment is if you have null geometry inside it in the relational view, there is an automated function that is called to create the tiles from these relational views and that creates a null geojson object where as it should not create any object in the first instance. So there is a way around that has been suggested to me on the forum and we will answer according to that. And then there is also a challenge of checking for null string values because, what happens is that when you're building the json object, it would create an empty json object if there is no value for the string. So we have to be very careful about these checks in our SQL queries that we are not getting any empty json objects that are just using up the database space.

So on the next slide there is another challenge mentioned that I would hand over to Halladay and answer any questions at that time. Thank you.

Azadeh Vafadari (MAHSA)

You can generate go - thanks Junaid. So just two last things that we wanted to talk and see if projects here at this meeting are facing the same issues and we can discuss further – 1) is the use of provisional data in Arches and we're interested to see if there are any other projects that they've been using actively this provisional data. Because for us, we haven't explored that much, but what we can tell is when those nodes have data in them, then it becomes difficult to flag them as provisional, let's say. And the reason kind of we want to use it is as I showed you in the first slide is a component of our data will come and is coming now from machine learning and these are the, for now around 6,000 but we're gonna have more and more sites coming from the maps and from the machine learning reading these maps. We know that we're not gonna have time to go over all this data - we have already 10,000 legacy data that we need to cross check against everything, from remote sensing and maps that we can find, and we cannot clean - and these work needs – it's also the field work aspect, to go to the field and really see if these mounds, if they really exist today today, whether there are archaeology or not. But at the same time, we want to push it into Arches. We don't want to leave it out - so kind of the question of whether provisional data would be a good route to use for this type of data or making another resource model and just use it as an external layer on top of everything. So that's one thing that we're now in the process of thinking and if there's anyone here in the room that can help us with or have used this would help. Do you want to go to the next one Junaid?

And the next kind of question that we have is: we know that Arches has this now capability of editing data with ArcGICS. There are projects using esri to kind of edit data into Arches. Since we're using QGIS, Quantum GIS, we kind of interested also to see if there are other projects that are interested in doing same thing of editing. It's kind of live directly from quantum GIS and into Arches and this if that's something that we can join as different projects or groups so we can also – if we can explore the ways of developing this for Arches. So it's kind of interesting to see how the esri one works with Arches and then how we can do this with QGIS. I think these are the two main things tonight. Now, yes, great.

Junaid Abdul Jabbar (MAHSA)

Yeah, thank you.

Azadeh Vafadari (MAHSA)

Thank you.

Alastair MacIntosh (City of Lincoln Council)

Well, no, thank you both for that presentation. It's - a remarkable example of using Arches on such a such a large scale and with such a volume of data and the machine learning aspect is something that I think is going to be very interesting in the future. I notice that Susan has commented that that's the hugest link is something that that she would be interested in as well. But I think probably now if I open the floor to questions and observations...

Andrew Jones (Historic England)

I think I think just - for me, you, you were talking about some of the machine learning work that you did was that was your machine learning work done outside of Arches. Was it done on data that was kind of

prior to loading that kind of informed the data loading? Or was it something that you had worked on based upon data within Arches itself?

Azadeh Vafadari (MAHSA)

Go ahead, Junaid.

Junaid Abdul Jabbar (MAHSA)

Uh, yeah, no. So it's outside Arches and it's based on the historical match basically. So the historical match gets your reference and then they're filed into a machine learning algorithm that detects the mound sites and creates a layer for them. And from there it's processed and imported into Arches.

Azadeh Vafadari (MAHSA)

This is purely based on the iconography of the mound features on the maps and kind of the previous ground truthing exercise that were done with our different organizations in Cambridge and India and going to this site - mounds features, let's say sites - finding that some of them are archaeology and they're really exist now and they're archaeology. So it's kind of pumped this idea of us - And now one of our projects today in India found one of these mounds being archaeology as well. And so we're kind of documenting all of them without knowing if they're either natural or archaeology or nonarchaeology, and if today, they exist or not. So it's not the remote sensing aspect with satellite imagery even, that's the part that we do before going to the field manually. But everything for now is outside of Arches. We just have this data back to understand how we deal with this in the processing stage.

Andrew Jones (Historic England)

If there's no one else, I was gonna ask another question or say another thing. I mean, you mentioned about provisional editing at the end there on how you're kind of dealing with that with your machine learning. I think using professional editing would be a good thing. I guess it's just a question about overhead on how many features and data you're going to be kind of running through machine learning and then having to kind of come back to later because you'll have to review it and unprovisionally change and edit it. I mean, I've been looking at using some kind of generative AI stuff or building kind of descriptions of structured data, kind of natural language stuff, and I would probably go around the same route as you and you use the provisional editing kind of part of it to kind of capture those initial natural language color translations and then ask a sensible human being to then go and check and make sure there's - that it actually makes sense. So I would agree that was the right way to do it.

Azadeh Vafadari (MAHSA)

OK, great. But have you explored in using that really in Arches and see how it works this provisional data?

Andrew Jones (Historic England)

We, I mean we have used it. I think it's just a case of rather than importing your data directly into the tile data field, it's like a provisional data field that you kind of write exactly the same value into and it just, I believe, it picks up the fact that you've given it provisional data and it will then give you that. Yeah. Yeah. I guess the question is if you do that directly in the database, whether it gets picked up and things like elastic search for kind of flagging in the UI. So that's the only thing I would question.

Azadeh Vafadari (MAHSA)

Thank you.

Alastair MacIntosh (City of Lincoln Council)

OK. So are there any other questions? For Azadeh or Junaid? No? OK, if you do as we're sort of going on and I can see that, Phil's put a comment in the chat as well. Umm, if you uh, do think of any further questions as we go on it. I think we can probably have a little bit of a Roundup session at the end to pick up any questions like that so. Well, thank you again for that presentation. Fascinating stuff. And now we'll move on to John Murphy's presentation on digital transformation work from the Historic Environment Division, Northern Ireland. Over to you, John.

00:36:25:00

John Murphy (Historic Environment Division, Northern Ireland)

Hello hello. Let me just see if I can share my screen here first. Can you all see this? Hope you can. Okie doke. And so yeah. My name is John Murphy. I'll be doing the quick intro bit and the interesting stuff will be coming from my colleagues Jana and Phil from Flax & Teal, who have been doing most of the work, most of the good work for us, but basically just to give you a bit of background to this. So there's Northern Ireland there. We're that- we've got a devolved assembly here where we at least nominally have sometimes whenever politicians can stop arguing with each other. And one of the things that's been devolved is obviously the management of heritage. It falls under the Department for Communities there, which is where I work. In Northern Ireland, I suppose differently to the way it would be in the likes of England and Scotland, Wales, but most of the functions in regards to heritage management are centralized within the historic Environment division. So that goes to managing the Historic Environment Record, managing scheduled monuments, building- the listing of historic buildings, um managing properties, et cetera, et cetera, et cetera. And as a consequence of that, I think the kind of there's been no real, there's been no real need for us to kind of synchronize our procedures and our processes with anybody other than ourselves really. And that's kind of put us in a somewhat interesting position. Now, I don't think we're particularly unique in that regard, but that had some consequences for how we go about managing our records.

So we've got the like I said, we've got the Historic Environment Record, Northern Ireland here and because of the way that the kind of processes and heritage management practices are managed here, essentially the kind of the asset registers we have, the Heritage Asset register registers, we have evolved within the context of those processes as much as they have within as much as – from a thematic point of view so. We've got a sites and monuments record. Still, we've got a historic buildings record. Still, we've got an industrial heritage record and they all evolve from various surveys in the 40s, 50s and 60s mainly. And the processes that go with these so scheduling monuments and listing of historic buildings, and the management of kind of marine heritage assets, how have kind of for- a long while they kind of sat neatly within this context whereby we've got this massive information fairly broadly spread. And it's been OK because of the fact that we're just the one organization.

And so from that point of view, we've kind of - the record is just evolved from the old paper maps that we had for the sites and monuments record through to the kind of more recent uh, JS based like web interfaces that we have and allow us and anybody interested or as a need to know, they can get access to the information. But fundamentally though kind of as you can see from the list down the right hand side it's- our records are still very disentangled from each other there. They're still very separate. And that that's that has caused us problems in the past, and most particularly from the point of view of the fact that some of these records aren't very well, they aren't very well enriched, so we've got certain bits of information in some records. We've got slightly more, you know, the records, some are held on GIS databases, some are held in SQL databases that are made publicly available, in some cases. In some cases, they're not made publicly available other than kind of fairly superficially. And as well because of

this fact that we've got, we've got we tend to have things recorded multiple times which is really starting to become a big, big problem. So I've given an example here of the landscape in the South Belfast; you've got the river Lagan there running through the middle of the of the map that you can see and the kind of shaded green area there is Beaver Forest Park which is a designed landscape from the 19th century, it might be [INAUDIBLE] can't remember but obviously there as as as you can see in the pop up there there's a nice house that's recorded on the list of buildings registered with some limited bits of information. But the same thing is recorded on the industrial heritage record there as a blue dot.

Now, when that's presented to somebody spatially on a map, they can, if they have their wits about them, they can put two and two together and say right, well, those dots aren't particularly far apart, but fundamentally that's the same record. And if somebody is using the industrial heritage record, to do anything that kind of research they need to be aware of the context of the fact that there may be information related to any site that's on that record held somewhere else. And that goes for everything. So obviously the designed landscape there contains, uh, a scheduled area highlighted in red. That's a wrath, I think or maybe a moat. It's kind of the the linear curve linear red area. There is a part of the Lagan navigation which is a canal, the purple dots either end of that canal or boundary posts that are recorded on a different record. So it's very disjointed and it means that any attempt at trying of interpreting the landscape or any of the kind of processes that we need to do for heritage management need to be very involved and they need people who have kind of an understanding of the various nuances and the issues here, which isn't very accessible. Frankly, it's a bit of greenery. It started to become a real problem. From that point of view, what we, over the last kind of five years or so, we realized that we need to start thinking about how we go about doing with this and in 2019 we uh, we initiated a discovery exercise with some of our colleagues in the Department of Finance.

I had identified the set of kind of key criteria. On the back of that in 2022, that was last year. Yeah, it was last year we went out and procured Flax & Teal, who have come in to start working on us to try and help us develop an Arches instance, so I will now hand over to my colleagues Jana and Phil, who will tell you all the brilliant things to do to fix all the problems.

00:44:00:00

Jana Lorencova (Flax & Teal)

Thank you. I genuinely hope everybody can hear me. Yes, that's a first success of today. Thank you, John. So as John said, we are doing the digital transformation of several different platforms actually onto one. That has been either buildings or historical heritage assets, but also gardens and all the sorts of historical data that we are working with. Umm. To be fair, it's exceptionally interesting and challenging at the same time, but all in very good ways. We are - we held several workshops for HED, so we could understand their needs as well as they could understand what are the options of the platform and what the platform can actually do for them, so that was all incredibly helpful, just in terms of communication and clear understanding to each other, which I think is always a key when you're doing something like this, it's a large data transfer.

So that was phase one where slowly entering phase two in which we're going to be more talking and concentrating on the workflows. But I'll leave that for now. In terms of Arches and what uh, they're doing for us and what we're doing within this: Historic England has been great help for us as well because they're users and they're using it for very long time. Phil Carlisle has been a great help, but also the Arches forum. Again, great source of information. If you have a question fired there, there's always someone there at hand to help. If I want to highlight some specific features, there are with the monuments the first challenge was very often there are several names for for one monument and also

there are larger amounts of descriptions. So what's the beauty of Arches is how much it's customizable. So what we've managed to do is keep everything that needs to be kept because the biggest fear always is to not to lose any data because nobody wants that. Nobody can afford that. So good, (Phil very kindly sharing his screen for me because we have it on joint presentation), but so at the top you can see all the different names of one single monument. So you can search through any single one of them and it will always come up. Same for the description. All the details from even a couple of decades past everything is kept there. So that has been obviously this is not the finished - we're still working on it but the current interface, what we're looking at and what we're working with as in, we're slowly updating all the data, not feeding all at once, but just testing the platform and seeing how, how well it's going to take on. And it's been working really well so far. So this would be a monument as a heritage asset because Arches is built with the historical data in mind. It's been very easy. Well, I say very easy, I'm not developer, but it's one of the most straightforward ones we've had, so it's fairly smooth.

On to the next one, the more challenging bit was the geospatial data. So when it comes to shipwrecks, obviously either coordinates northing and easting, converting from one to another to be able to pinpoint it into the exact point on the map we needed to, but also when it comes to the land we had a couple of interesting examples for larger polygons, so I really hope I'm not going to butcher the names, but Gray Abbey Bay that had about, I believe, John said, heads up. It's about 26 different sites on one polygon, but then at the same time there was Newry canal, which is just one side one entry, but it's very large polygon through the vast area. So that will be those are our sort of key points of interest to have it as clear as possible, but also as accurate as possible. Lastly, my personal favorite because I have a slight librarian background. We were also given the - all the bibliographic records. Now we needed to structure it because the way it was, Arches wouldn't be able to really process it. So what we did is create entirely new entry for it, where we structured the data in terms how Arches would be reading it. So we had every single column as a new entry and then Arches would be able to read it and feed it into its database properly, but also that made mapping really easy because it was already customized by us to go into Arches. So that was thirteen thousand entries. It's still work in progress. We're nine and a half thousand deep, I believe so. Not much to go, but that was my personal favorite. To be fair, because it's my- This is my baby. But it was it was good exercise. It was good seeing how it's going to read how it's going to integrate and how Arches is heavily customizable, which I find personally the best- one of the best things about it. In terms of customization one good example actually that I don't have a slide for because I wasn't actually sure how would I show it properly just yet, but dates. Dates were one of the biggest challenges, I believe, mostly because of the building data and the second survey, there are several meetings and entries and we needed to find a way how to preserve all the data. So with with the magic of associated records within Arches, we're - I'm saying we are, but hopefully fingers crossed it should work, we will be locking together three different resource models to connect to preserve all the data, but also make it nicely connected for not just the staff interface, but also the user interface to see how it's going to nicely connect together. But also it will be very easy. It will be very easy to navigate from one to another and it will be all connected in sense of this is the historic asset. This is the building that has second survey done to it on such and such date with all the information. But also there is activity associated to it within the meetings that went into the second survey or the building to then approve it for scheduling or updates. So all this spiderweb together is going to work on the second survey which is I think the second largest dataset we were given. So it's that one was very challenging in terms of connecting everything properly so together but also keeping everything the way it needs to be and to be able to read easily.

But with that, I'll also stop rambling and I'll give it over to Phil Weir, where who's going to do more of the technical talk, who actually knows what he's talking about when it comes to Arches and the technical side.

Phil Weir (Flax & Teal)

Thanks, Jana, I realized this was listed as two separate talks, so I don't know. Stuart, if you wanted to add a thing in between, if you're happy enough for me to carry on. Or, uh, if there's any questions before I start.

Alastair MacIntosh (City of Lincoln Council)

Hello. Just to just a chip I'm thinking no, no do please carry on. Although if you want to take questions now I think that's perfectly reasonable thing to do. But I was just going to chip in and say after you've finished and had some questions, I wonder if the general feeling is we might take a ten minute break for cups of tea and heading to the loo and then come back for the rest of the presentations after that. But yeah if you want to take some questions on the first part of the presentation now that I think that would be perfectly reasonable thing to do.

Phil Weir (Flax & Teal)

Sure, sounds sensible.

Alastair MacIntosh (City of Lincoln Council)

Matt's got his hand up there.

Matthew Jones (Historic England)

Yeah, I was just gonna ask Jana about the bibliographic data. I noticed that the sort of – the sort of after you've done the work on it, there was still a column for bibliographic ID and monument ID. And so did you manage to come up with a programmatic way of getting rid of duplicates where the same source had been referenced multiple times?

Jana Lorencova (Flax & Teal)

Yes, duplicates. That was one of the slight challenges. So there is no duplicates in terms of individual records. What is happening every now and then is that historically the way it's been done and - John feel free to jump in any time - sometimes there are two records on one, so in terms of monuments are all individual, there are no duplicates regards to that, but there are two or three records tied on one cell or in one entry, so that is being creating a little bit of a trouble, especially when it comes to dates. So that's creating fuzzy dates for us. So we're working around that for now as in very often you have just a year as in and if you plug that into Arches, it automatically jumps to 1st of January and it's like, no, no, no. We just won the year so that our developers are working around that specifically field and Kanika who couldn't be here today, but she's a wizard. I have cried on her shoulder many times. But yeah, that was that is still a challenge.

Matthew Jones (Historic England)

Yeah, no. So yeah, now we just had a sort of a distinct problem with our bibliographic records in that anyone who's familiar with HBSMR will know that, you know, you could only create one bibliographic source, and it wouldwe ended up with something like three thousand references to every individual volume of pens and all of Victoria County histories. And the only thing that was different about it was the page number depending on what monument it was. So. Yeah, and I had to do that laboriously. Open refined, and we then had FME later on down the line. But if anyone ever comes up with a more

programmatic way of dealing with that sort of thing, and I'm sure any HR's in future wanting to move from HBSMR to Arches for HERS would be really glad to know of it.

Jana Lorencova (Flax & Teal)

I think I think my biggest advantage working with this bibliography is that I could immediately customize it to Arches, that it wasn't a straight feat, but it's rather me doing it the way I want Arches to read it. So that's I think that's a huge advantage, to be fair.

Matthew Jones (Historic England)

Thanks.

Jana Lorencova (Flax & Teal)

No worries.

Alastair MacIntosh (City of Lincoln Council)

So does anyone have any other questions before we let Phil carry on? OK, no, Phil. Then do please proceed.

Phil Weir (Flax & Teal)

Great. Thank you. Let's see if I can share again here on the right page. OK, hopefully that's visible.

Phil Carlisle (Historic England)

Wrong screen, Phil.

Phil Weir (Flax & Teal)

So yeah, so I'm going to talk a little bit about some of the. Ohh.

Phil Carlisle (Historic England)

There you go. No.

Phil Weir (Flax & Teal)

No, no, let me try again.

Phil Carlisle (Historic England)

Yep.

00:57:20:08

Phil Weir (Flax & Teal)

Is that you see - Yeah. Brilliant. Thank you. So I was going to talk a little bit about some of the technical steps we've been taking and some of the direction of travel umm and thanks to John and Jana there for the kind of background in context and all the I would say all the interesting stuff, but I think it's once you spend too much time in technology, you start to appreciate getting your head out for a while so. Where we've been working is taking - trying to take a standard approach with some of the modern DevOps processes and get that running with the Arches tooling. So I'm going to go through I think that my idea for how to format this is I'm gonna go through a little bit of description for verbally and some of the pros and cons and then if people want to, um, ask questions, I can show a little bit more detail. So not too sure what what's of interest to people on and what's details that [INAUDIBLE] me so.

Uh, we're currently uh working with Kubernetes. There's a few reasons for that and I suppose the main ones are that our actual structure on our code is reproducible and scalable. So once we've got that up and running, if something happens to it, it's relatively straightforward to bring it back up. Um, data's a slightly separate consideration, but in terms of running lots of processes or work or the demand increasing, we can respond to that reasonably flexibly. Rather than having to manually intervene and setting up things like auto scaling and so forth, it's a bit simpler than perhaps otherwise, and also all of our infrastructure can be code defined. So I know some people are working with things like Terraform, uh, one of the nice things about Kubernetes is that kind of allows us to go right down to the level of individual Python processes. So to do this, uh, we've also been trying to especially uh, you know, our team is a quite a variety of experience in the backgrounds. And one of the things we've been quite keen to do and you'll see a scene through this is to make it easy for our developers and data folks to work with Arches and in ways that are relatively industry standards. So uh, we've got it so that they can push to get that will create a Docker image and that in fact creates two Docker images; one for wrapping up the Python and we're doing this on top of an Arches project. We've done that with, you know - with great project. Was there a question there? So we'll create project and then we've added in some standard template tools, mm, which we've got in a repo if you're interested in some more information, I actually just posted to the Arches forum earlier today about it. And that allows us to uh, build that container in GitHub actions and every time one of our devs makes a change and pushes it to CI, then we get those containers rebuilt. We've got some tests that will run at the moment, some fairly basic ones, but they'll click through, they'll start up an Arches instance and click through it in the CI and tell us if something doesn't work.

Alongside this once we get our Docker image deployed, one of the things we've been quite keen to do is make sure that we've got not quite but almost vanilla Docker image for the Arches codebase itself so our images are relatively thin layer on top of that for our individual project. We can then pull that into our, you know, Dev and staging environments with minimal effort, so we can simply say OK, we're ready for an upgrade here. One thing we're considering doing for those are interested is setting up Argo City for continuous deployment, but if anyone's interested. Please let me know. One of the other reasons that we're keen on Kubernetes is it does give us a lot of power in terms of things like health checks. So for example, Kubernetes is smart enough that if we say OK, we there's a new deployment coming, that it will keep the old one running until the new one, the new Python process and Django is started up is running and has passed health checks and then and only then will close down the old one. So in the ideal world a user could be carrying on using Arches without ever noticing that we've done an upgrade at the back. OK, so another direction that we've been working on, umm, so that that in some ways has been to try and make things a little bit more accessible for the development team that they're not having to think too much about how Arches is deployed. This side is trying to make it a little bit easier for our data folks that they're not having to think too much about Arches internals or Arches SQL. And uh, quite interested in a number of different approaches to this, so I was fascinated by the first talk as well. We're taking a little bit more of approach, slightly further down the stack where we run a Python process, for anyone who's interested in Starlette but it imports uh the Arches modules and Python and auto generates an API for us, which is a little bit maybe a little bit analogous to the views in SQL, but without having to have data access. So for example it will work out what the correct endpoints to create are so that you can write a query to pull back or to create monuments, let's say or maritime vessels.

Because that's using quite a standard system which, uh, GraphQL, we're able to have a fairly thin Arches client that can then reach in and again, neither of these things needs to know anything about what graphs are available in advance, except we do provide something a little bit analogous to the csv file that would be used for defining monuments and are defining mappings and import, but none of the code

actually needs to know and then that client can be used in, for example Jupyter notebooks or in Python scripts to send and receive things from an actual Arches instance. So some of our we've been quite keen to test this by doing a fairly proof of concept level implementation of it, trying to get the kind of API structure reasonably standardized and then improving from there. And we've relatively recently added the ability to Umm make relationships within a single create and things like that. One design decision that we've tried to make is to minimize as far as possible the appearance of UUID, so the graph QL API will - you can essentially say what the structure you want is and what fields you want and what resources you want to be our graphs you want exposed so that a user can simply say I want to put these five fields a little bit like in the database view, as user can just use an ID with all of the fields that they wish and it will work out the structuring into an Arches compatible layout at the backend. So a little bit less so not really having to expose new ID or new group ID to the users.

And one of the nice things that we quite like about graph QL as well is that it's kind of self documenting machine to machine tool. So it gives us a little IDE out-of-the-box where we can actually explore and if anyone's got a question I can show that at the end. It comes with a little browser based IDE where you can kind of click through and we've - A design decision were considering, but for the moment we've mapped concept lists to lists of Enums so in clear terminology you'll see example of that in the center. The actual API itself knows what the options are, umm, and can therefore validate when someone sends, let's say a value for a cross reference source that's not actually contained within that concept or within that collection. So that's been quite helpful for giving a kind of standardized set of tools for our data scientists play without really having to delve into the Arches database for the whole team. And the idea with that is then that we can actually have our data scientists working with things like Jupyter and being able to work with pandas data frames and then sort of then basically push that pandas data frame up to Arches. And there I suppose there are two main benefits for that at the moment where we are is really. A stability level that works for ingestion. We want to not really thinking about deploying this as a live thing anytime soon, but the hope would be you know within the next six months to a year. But that it's something that, uh, you can use as an alternative way to access Arches data and filter things through user permissions and so forth. And how that works for external as a hobbyist developer I got into Arches through open source and open data originally and I'm quite aware that these kinds of tools are fantastic for engagement and particularly external linking and so forth alongside things like sparkle and points.

One note about where we're going, there's a few things we've got on the road map about the project that John and Jana were talking about and just watch generally in Arches interests we have and we're having, so it was - fortunate to be able to uh pop over with Jana and Lana on our team to Amsterdam last week and it was lovely to see some Arches folks there. One of the things that I kind of got chatting a little bit about was how we could maybe improve the experience for permissions management, and one of the things that we're looking at doing is trying to get a bit more flexible user and group system that it's a little less surprising. At least that's that's been my experience. So keen for us thoughts on that and whether people think that's overkill or whether that's useful, but certainly something that we are planning to do. If anyone's familiar with the casbin system who would be to integrate it with Django casbin , which is kind of a tool independent and uh in fact language independent authorization framework. So you can have permissions that get passed between you know there could be shared with external systems or with new API or things people want to build as plugins, etcetera, etcetera. I should apologize to John, cause this is a fairly recent diagram, so this is this is rough. But a rough idea of where some of those things that I mentioned are, some of the things we started off quite early in terms of the infrastructure. So the title of this talk was originally Arches 7 and HER as one of our first challenges was trying to get Arches-HER working in Arches 7, there was very helpfully thanks to Cyrus and the Farallon team on the repo, but one of the things we're doing is trying to be set on top of the latest changes from

the main branch. And that was quite an education process itself. So we've got that running. And if there are people who would be interested in in that, we've got it, I think we've a draft PR if it's useful.

The next step I think this is probably that the most challenging bit for us was the webpack. I noticed that's a discussion that's been on the forum last week. So because webpack on static files for those who are familiar with the build process are both present, it's been a little bit fiddly for us as we are deploying our static files and our Python separately so you can hit the static container you know a hundred times without ever triggering a Python request. But it then means that we've had to rework that quite a bit for a webpack that's now seemingly so far working (touchwood). But a lot of that early work has been around the infrastructure and the only other things I haven't really mentioned there are the work on some of the offline mobile workflows – this is something I know it's been discussed and a couple of times so upcoming work and more general systems integrations. But we are aware that there is some enthusiasm to try and do a, you know, an end-to-end solution that's come up, it's workshops as well would be very interested in what's happening in that space, of offline mobile workflows. But we're also open to you if it's makes more sense to do some quite specific things with offline workers and progressive web apps, which we find quite useful in the past, but that's something we'd be really interested to be part of the discussion on and where a number of people have raised it. So that's essentially where we are. And I guess there's a range of points there that people (I hope) have some questions on and wish to quiz me and whether or not any of our design decisions make sense. So please feel free to do so and then I can show off some fancy graphic QL stuff. Hopefully it'll work better than when I was trying to demonstrate it in Amsterdam and the entire content delivery network that the JavaScript used decided to go down for twenty minutes, which I maintain is entirely not my fault, and as far as I'm aware, affected everybody on the world on every project unrelated Arches, but that's my that's my claim and I'm sticking to it.

Alastair MacIntosh (City of Lincoln Council)

Well, thanks very much for that, Phil and uh, and thanks to Jana and John as well. I mean that's, umm, that's a fascinating insight into the, the sheer amount of work that needs doing to go from a legacy system to an Arches deployment. And I have to say, John, I feel your pain very much in that regard, although I'm now a good five year past that point. So are there any questions?

Andrew Jones (Historic England)

Many. Is it the right forum for all of the questions? That's that's the question. I think for me, you've kind of demonstrated a load of kind of areas that you're taking things forward, you know kind of graph QL. Obviously all the Kubernetes work that you talked about already. I guess the question is what's your plan on kind of Arches project contribution because you've got a load of staff, everyone now wants it. Normally that's kind of something shiny, everyone wants it - kind of what's your plan for giving this stuff back to the community?

Phil Weir (Flax & Teal)

Great question. Thank you. And I promise I didn't plant it. Yeah. So everything we've done. Obviously, aside from the confidential data that we've been given for obvious reasons, but everything that's we're working on is being developed in the open. So we've got repos, they're linked from the Arches forum, they are there- that means because we're developing in the open, there is quite a lot of that's alpha code. Some of that's a bit more mature. And obviously since you know we want to get things stable going ahead of going into production for obvious reasons. But we have been using some components of that now over several Arches projects, umm, one of the things I was just actually messaging about today was it would be good for example, I know there's a few of us who've been talking about different

context, Docker and Kubernetes, by the ways that we could align that. We've got, you know, backward a year ago, I think we did some workshops and things around. OK, what conceptually can we align? But I think actually we're getting to a point where we really useful to try and technically align that even if we have different kind of stock ways of doing it. If someone comes to Arches and says, hey, I wanna I wanna set up something that works in Kubernetes that there's a reasonable starting point, maybe different people doing different things, but at least that they've got an idea of what we'll get them going without having to kind of go back to square one. So yeah, I think for me, how are we going to do that? At the moment, what we've been doing is keeping the stuff up updated, trying to basically battle test it by having John tell us when things are working and then I think we're getting to the point where we want to maybe organize another, maybe organize another call to go through- OK, here's where why we've done these things. Everyone can kind of show and tell and we kind of say, OK, is there something common here or do we have all very different needs? But yeah, I'm very keen for feedback on any of that of course. And um, any of our code please don't be surprised by our alpha level graph QL code. That's my heads up. It's great for ingestion, sorry.

Chantelle Smith (Historic England)

I'm sorry, Phil, just a very quick question. It's- a short, it'll be a short answer. And what version of version 7 did you put to Kind of get Arches-HER working with-

Phil Weir (Flax & Teal)

7.2.

Chantelle Smith (Historic England)

OK, brilliant. Thanks, that was gonna be a short answer.

Phil Weir (Flax & Teal)

Yeah, well I have seen. There's been discussion over the last week about 7.3, and I haven't, yeah, our last three, our last three based on to the Arches-HER main Branch was, I think two months ago. So it's strictly speaking it to whatever was there then. One of the things that actually hasn't come up, but I think is an interesting side effect of this is when we started initially we pulled in Arches-HER as it was the time into Arches 7 to see how we got on. That was back six months ago. We hadn't started solving some of the problems that we realized were being solved on the branch, and in order to do Arches-HER. Thanks folks. So we pulled that in and then what we realized was that umm we were switching from, well, we were kind of caught between the difference between monuments and heritage assets. And what we since worked out is that we probably want to be continuing to use heritage assets even though we understand that, you know in England It's gonna be a different requirement. So one of the things I'm really interested to see is how we can do that while continuing to pull in updates periodically. And Git is our friend, which is why we I've I have been doing some fun, fun, fun stuff with rebasing that I'm sure you can identify with, but that's one of the reasons. Again, like Andy said, if there's anything that we can do to try and see if somebody else doing, that that would be great.

Chantelle Smith (Historic England)

Brilliant. Cheers, Phil.

Alastair MacIntosh (City of Lincoln Council)

OK. Anymore questions at all. Can't see any hands going up? Hang on.

Andrew Jones (Historic England)

I was. I was gonna say I think the only thing is Phil, we probably need to get something up on the forum about organising at least a Kubernetes kind of workshop. But I also think looking at a slightly more joined up technical roadmap with Farallon because obviously they're starting to put together a roadmap and I don't know. We also have a situation where we're trying to kind of keep up as well. So I think starting to work a little bit more holistically and kind of collaboratively in having a joint roadmap.

Phil Weir (Flax & Teal)

Yeah, I think that's a really good point. And we've been fortunate to have some uh, through some of the previous user groups, we had a catch up, I think. I think maybe there was a brief workshop about six months ago. I think it was with Cyrus if I recall and yeah, I was having a chat to down in Amsterdam as well and I think that's you know we are trying to pull in their work but similarly it's as you say if the road maps are aligned then it makes what we're doing much more much more reusable because it's getting pulled back in. Definitely. Thanks very much.

Alastair MacIntosh (City of Lincoln Council)

OK. No, thank you very much. That was really useful stuff. Shall we take 10 minutes then? For a comfort break, maybe time to make a cup of tea and be back here for five past two, thereabouts? Yeah. Uh, Stu, can you pause recording for that?

Stuart Cakebread (Historic England)

Yeah, if I could figure out how to do that. It might just have to stop recording. We're just start another one. Excellent. Now. I've achieved Mac.

Alastair MacIntosh (City of Lincoln Council)

Well, welcome back everyone. I hope we're all suitably refreshed. So now we're going to carry on with the second set of presentations and we're going to start with, if I can just get back to my agenda. No, I don't want to save my changes. OK, so now we're going to hear from colleagues from Historic England, Matt, Andy, Chantelle and Paul, about an update on the progress of Arches for HERs and something that a very important part of the project is the accessibility compliance work. And I'm certainly very keen to hear how they're getting on with that. So over to you guys.

Matthew Jones (Historic England)

Right. No, let me just share my screen and make sure I'm on the right screen and you want to let me know if I'm not on something that looks like a PowerPoint presentation.

Chantelle Smith (Historic England)

Looks good.

01:22:21:11

Matthew Jones (Historic England)

Looks good. Marvelous, right? See if I can get that all the way - yes, so I'm gonna be just speaking from a lowly end user perspective. It'll hopefully be fairly light on technical detail from my side of things. These are just some of the latest changes that's come in the Greater London Historic Environment Records version of Arches-HERs, locally known as Keystone, as our project name, and obviously in the background there you've got our fancy new front page was just one of the latest and greatest updates is that we have some nice branding when you land on the front page, which is always a good start. But just for the benefit of anyone who is new to uh Arches-HERs or for Greater London's use of it just a quick bit of background as I say, Keystone is the project name that we used for Greater London's

implementation of Arches for HERs, which is something that we've been developing for a long while now in collaboration with the GCI and with Farallon Geographics and the City of Lincoln. We have, we've been live as of late summer, early autumn 2022, internally we've been using it in house as our live HER service and our colleagues in giving archaeological advice. And I've been using it for that long, but we are now just about on the brink of sharing it with some limited external partners to start testing out some of the more recent changes that allow sort of external user groups to be set up and testing some of the permissions there with what they can and can't see, and also just to get a bit more user feedback from a few trusted partners outside the organization for how it functions for their users and things like uh conservation officers, academic users, local societies, and that sort of thing. And then the idea is that there'll be a full public release in late this year, early next year, which will be of the Arches-HER package as a whole, as well as just for the fully functioning public version of the Greater London version of it.

We are currently on Arches 6.1.1, and the reason for that is that there is an ongoing project as part of our update to Arches Version 7 where we're collaborating with Farallon to incorporate the aforementioned accessibility changes, which will make us compliant with the WCAG guidelines on accessibility for online applications more in which we'll be hearing from Paul and Chantelle later. But the so there's a couple of key features for those of you. Again, as I say, who are not familiar- Weren't at the last user group or haven't seen what we've been doing thus far. So one of the main things that differentiates Arches-HER from any other Arches implementation. Firstly, there are these consultations workflows that were developed for us largely by Farallon, but with some of our own input as well in some areas. And so there's this sort of workflow front end that allows and for a slightly different approach to inputting data for this sort of case, work style data entry as well as just recording from a HER perspective, this is more for our colleagues offering archaeological advice and working through the planning system, but I'm sure they'll be other applications of this as well that others would be interested in using. It sort of splits what used to be the old HBSMR consultation system into two initially, so there's application areas and consultations, and this means you avoid having a big fat stack of polygons where you've had multiple consultations on the same site. It now means that you can just have one geographic application area and then you can have one to many relationship with lots of consultations on that same site, which are all then related back to the application area and then using this same workflow system, you can also add the communication and site visit cards to the consultation model so you can record conversations that you've had about that particular site, that particular application that can record things that happened on site visits like photographs and how that's impacted on the advice that's been given. And then finally you can generate a letter that will give the official guidance official notes on and what planning advice has been given for that particular consultation.

And so that's just an example of the consultation workflow without me having to go through the whole thing. We're just bouncing through this screenshots to save time, so that's just showing that through the consultation workflow application areas appear as a feature layer within that workflow so that you can create that relation. That spatial relationship within the workflow of consultations. Then, once conversations have been created, there's this active consultation screen which previews all of the current active consultations. You can sort them by target date or log date. You can search by who's casework it is, and there's a traffic light system for how close it is to being due and then finally, this is just how you would generate the letter using the correspondence workflow, and there's been some recent changes made to a lot of those letters so that they're more consistent in their formatting. This little [INAUDIBLE] will play text that comes in the box. So that would be customizable to anyone else who wants to implement it. And the other key feature which has already been alluded to earlier this afternoon, we have again, Farallon helped with this – got an ArcPro Direct link up. Which I've got a quick screenshot here, but I might and this is very dangerous ground I'm treading here, but might be able to

quickly live demo something I did set something up earlier, so let me just can we see ArcPro here. We all good? Just make sure my connection still running should be yeah.

Chantelle Smith (Historic England)

Yes, it's showing.

Matthew Jones (Historic England)

This is - you can use the Arches connection to either edit or create resources and then you can also open up the Arches browser interface. Currently it's in chromium. We might be changing to a different service for that in future, but that's what we're at for now. So this one is currently a point geometry I want to update to a polygon, so I'm going to select that; click register feature with Arches. It should recognize that that's an activity and find the resource instance ID. I'm going to edit the resource - I'm already in edit resources. If I switch back to my contents, I'm going to turn on this working layer that I have in Arc Pro. And I'm going to my current selection and select that polygon instead. Yeah, back to resources. It still remembered that that's what I've selected. But now I can upload this geometry and I can say that I want to replace the existing one. It gives me a little notification to ask if I'm definitely sure that I want to submit that polygon. I'll click OK. And then hopefully. You can click this button down here for edit using Arches resource editor. Ah, that's crashed my ArcPro. Marvelous. And that's what happens in live demos. But let's see if I can - not strong enough to find that now. Oh, well, never mind. Such is life. But yes, that should theoretically take you through to uh, the Chromium plugin and allow you to show see that that has it. That resource has had its geometry changed, so apologies that that's ArcPro being unstable. I think rather than they plug in unfortunately, but never mind. Umm, so there's some new features as of the latest couple of updates, so these will be new to everybody.

We've got a British National Grid search feature, which again, this is just a quick screenshot of it. There's not a lot to show off, but it is very handy for us in the HER because the vast majority of our day-to-day work is dealing with inquiries that just allow us to just ask us to put a buffer around the British National Grid center point and obviously out the box Arches deals entirely and latitude longitude. So again, if I just switch to Arches, I should already have a British National Grid reference saved there, so I'll put that in in 12 figure format. It automatically populates the X&Y 6-digit format as well, and then if I want to say that I've got no not 1500 metres around that point, you can see it's sort of got a mini preview map of what the buffer is in here But then it also has already given me my search results. I've - this is a saved search that I've already got set up for you normally send out with our HER results, so if all of the all of the resources that you want to send out as part of the HER search are already set up as a saved search, and then you can just do the British National Grid filter and then do an export. We can theoretically get quite a lot of our HER searches turned around within a matter of five to ten minutes, which is obviously brilliant for our productivity. And then we return to the presentation - one of the other new features is that we've now split out the overlays using spatial views as well as just the standard geo-spatial coordinates thing that comes with the overlays for each resource instance. So for monuments, we've now and for areas we've managed to split it out so that as well as displaying all monuments, you can now only display designated monuments. So that's anything that has something entered into the branch for designation and protection assignments. So just to show that quickly, you can see there that with both of those layers turned on, we've then got some points. We've got all points in green, but then those gray ones are only those that have been given a designation of being a listed building. So you can now see those separately or together and compare and contrast quickly and visually.

Then finally, one of the other key features that's been updated for our purposes, so with the way that we've done consultations, the application- the relationship between application areas and consultations,

like everything in Arches version 6 onwards, that relationship is sort of created in one direction, but then the only way you can see it back in the other direction is through the old related resources view, which in and of itself is a kind of relic of Arches 5 and older so that reciprocity and making it more easily visible or something that was quite important to us, especially as the directionality with the application and consultation in the area relationship, it's actually created in one direction, but more important to be able to see it in the other direction. So when you create a consultation, you relate it back to the application area, but it's actually more useful to be able to look an application area and see all the consultations. So what's now - What Chantelle and co and Andy and her colleagues there have created this, this lovely report view in report mode, and we'll hear more about the reports themselves from Chantelle, momentarily, we've got in associated resources this section titled Resource Referenced By which can show you any resources that have been related back to this one in the other direction. And then there is also a column for the type. So theoretically at the moment this is only present for this application area consultation relationship, but in future, this could be extended to be in report view for all resources and so that that reciprocity is future proofed against the possibility of that visualization of related resources. that's as I say, can be relic of older versions of Arches if that ever gets deprecated or sunsetted. Then this kind of feature proofs against that and keeps that possibility of showing that relationship in both directions. So that's going to be quite useful going forward as well.

And there are just a couple of other little features that I just wanted to summarize before we before I move across to Chantelle. There's some changes that we made to the permissions, as I said, we are going to be having a limited external launch and then in future the main big public launch. So there's a few changes that's been made to some of the user groups about what they can can't see, particularly with regard to that consultation data, but also that they can't link through where those things have been related from the models that they can see. So if there is a related consultation from an activity, for example, making sure that they can't click through and get to that information via another resource than just the search page. And as I say, there's also been a few little refinements to the consultation letters, but for a more technical a summary of some a lot of the more recent changes, I'm gonna end my presentation there and we'll move on to whichever Paul and Chantelle wants to go next. So. Moving on.

Chantelle Smith (Historic England)

Shall I go next, Paul? Leave the accessibility fun for the last. I can't hear, you're muted. I'm assuming that's a yes though. So I'm- I'm gonna take it.

Paul Hudson (Historic England)

Yes, yes, go for it.

Chantelle Smith (Historic England)

Excellent, right. So I'm just gonna share but can everyone see that?

Paul Hudson (Historic England)

Yep.

01:36:51:00

Chantelle Smith (Historic England)

I can't see people, so I'm seeing excellent, right? So hello, I'm Chantelle Smith. I'm Senior Software Developer, Historic England and part of Andy Jones's team. And Paul is one of my colleagues, along with Kingsley Hodgkinson and Rob Oates. And we've been customizing and extending Arches. For quite some most of us for quite some time, and Keystone has been the latest thing we've been working on. Umm, so

I'm really going to talk about what customizations we've made specifically for Arches for HER and Keystone, but some of that has been building on previous projects as well. So we've been doing a lot of extensions, so that we've got a data type widget, several functions and as Matt showed, the BNG search filter. That's been a lot of what I've been focusing on been those extensions. We've been looking at bulk HTML reports through the functionality that has been coded in by Farallon, but we've been extending those to fulfill the requirements of the users for Keystone. We've also been extending and customizing the kind of single view report views, which is what Matt showed earlier. To - we, we, Farallon has done a vast amount of it, but then there were some things that came up later on once the user started having a look at how things were and we just had to kind of tinker with those a bit. We've worked on putting restrictions in for export results and also viewing map layers because we know that this is going out to the public, so we want to have a little more control over who can do what. Umm, we've been, one of the things we've been looking at is branding. So Paul, who will be speaking after me, is the front end developer has been doing a lot of branding related exercises with Keystone, but I've been working on sort of the endpoint of branding our e-mail communications. So using the templates that come out-of-the-box with Arches and extending those so that we can have our own branding and information on them. We've used spatial views to create custom overlays as Matt showed to enhance how we look at the data and split out sort of certain elements within that have certain information within the resource. And we've been making small other changes as well. For example, umm we wanted to link to help documentation that one of our one of the team who trained and does the documentation had created so we didn't want to use the out-of-the-box help. So we've just kind of changed the base manager a little bit to allow us to point to our own help documentation.

So just to give you an overview on the extensions that we've worked on, Umm, Andy ceated the BNG filter because most of the information that comes in and requests are based on British National Grid, so just to make it a bit easier to see whereabouts you're looking for your results. I don't have the map background there. I don't quite know what happened, but as you can see you can see the the buffer around the point is is digitized as well, so you get not fairly good idea of where you're looking at. The BNG data type and widget originally came out of a previous project called Warden, but there has so basically what it does is you can record a center point with for your resource and you can enter in either as alphanumeric, British National Grid, absolutely British National Grids, or Lat/Long and depending on which option you choose, it will transform that information or that that coordinate into an alphanumeric British National Grid value. What's come up for us new in Keystone has been making it available to search in the advanced search. It is, however handled as a string, so you have to kind of treat it like a string rather than putting in just the 100 kilometer letters and then a couple of you know number and you can't expect it to understand that it should be padding things out or expecting you know within to narrow down the values as it were, so I don't know if we want to extend that at some point to make it a bit more a bit smarter, but that's how things stand as they are at the moment. Umm, we've created quite a few functions to make things a bit easier for the end user, so we have two functions that kind of work in tandem, so it's there BNG point to Geojson and Geojson to BNG point, which basically means you can put in a National Grid reference in a BNG data type and it will trigger the function and it will create a point in a Geojson node, feature collection node, and conversely if you put, if you change some of the geometry it will then re calculate the center point and populate the BNG data type node so those two work together. We have a couple of versions of the generate unique references though this will create rather than having a UUID, it will create a unique reference number. That's probably easier for users to use on a day-to-day basis without overwriting the node. The reference instance ID- resource instance ID. We have a function that takes the the point the Geojson and works out related areas against a web service and we're currently working on that to try and make it more generic, so kind of create a scaffolding so that we can then put that out to the community to use. We found that we needed a

function that would append the unique reference ID internal one rather than the UUID to a name of a resource. So we've had to create a new- I can't remember what the function's called- the primary descriptor function to stick those two together, so we've got our own function for that and we have created a function that allows you to take notes within a card and choose which ones you want and then populate another node within that card with the with the information there. So for this example, we've taken addresses. So in order to create the full address we have certain nodes that are put together and are used to populate that full address node. So that's the functions. These will all be available. There are at 6.1 at the moment, but we've got a body of work to get them up to version 7, and they will be available on our GitHub repository for other people to use.

So another thing that we've extended has been creating custom reports for our bulk export options, so if you go to search export, you've got your selection; you select HTML and it generates something that's a bit like this, so it's branded and it's being made accessible for our templates. As you can see up here, it's a bit code-y, you do need a developer to create the template that the values get injected into. That is a bit fiddly, but it works well and it is customizable. We also applied an export limit so that if you've got fewer than 10 results, you can get a direct download. If it's more than that, it gets pushed off to celery, which manages the task manager, and that can run in the background and send you an e-mail and a notification once it's done, so it doesn't stop you from continuing to work on what you're working on. If we go to the resource reports, as Matt was saying, we've got a couple of things that have been changed to make it these more tailed to what we want at version Arches 6, there was this ability to have these tabs though, rather than those of you will know kind of version 5 and backwards, and even out-of-the-box. Now you would get the report that was just kind of a long single page of all the information, all the nodes, and that wasn't particularly helpful or always to be able to flick through all the data. So these new reports are being created mostly by Farallon. They've got – so you can tab through them based on I think it's basically groupings of cards and uh, and it just makes it a bit easier to read through the reports. As Matt said we created certain bits that allow you to look backwards at how things are related at the moment it's just consultations related to application areas, but it is written to allow you to choose which model which graphs you want to see that are related to the resource you're looking at the moment. SO it is very flexible in how that bit works.

Yeah. So we've also been looking at how we restrict things, as I said, because it's going public eventually, we want to have a bit of control as to who can do what and who can see certain information. So there's out-of-the-box restrictions like permissions on graphs, but this is functionality based. So as you can see here, I've got screenshots of two different user accounts. So this is my main one, where I have access to- I've been put in this search exporters group so I get this button allowing me to export my my search results, but in my test one I'm not part of that group and that functionality is completely taken away. So there's no no way to kind of get round being able to export things you're not supposed to be able to export, and that is for those of you who see and know the kind of code side of Arches that's all set up and configured in the settings local .py form. We've also got the ability to restrict map access. These are on the map layers and we've got functionality so that you go into your choice of map layers. You select your map layer, and then there's this new button called Object Permissions, and then you can choose if there's a group, what they can do. So we've got four people who are external users, they can't access that map layer, so it won't come up in the overlays or the base maps that are in the user interface. As I said, we've got e-mail branding, so you don't have the out-of-the-box, it all comes out pretty much just text based, but you can add HTML files to your sort of Arches code and what I've- what we've done is split it out so you've got a header, you've got your footer, so they can be kept consistent across all of your emails, and then they're basically injected in or included in, and then you've got your actual text that's based on you know whether it's a search export, whether it's a password change, whether it's a

profile change so that you don't have, you only have to change things that are consistent once, but then you can have much more flexibility with the purpose for the e-mail.

Uh Spatial views. Hopefully I'm not going to do quickly so with spatial views in Arches it's preview only, so you can't. It's not to do with editing. This is all generated from what's in the database already. Umm it's it allows you to create a subset, so hopefully to enhance your understanding of the data it's created directly in the Postgres database. So you run a SQL command to generate the spatial views. We then make them available using PG feature serve or PG tile serve. That's not the only way to do it, but that's the way that we're doing it. And then we take that feature service or tile service endpoint, and we reference it in the map source configuration in the Django admin interface which comes as part of of Arches. And we also put a filtering. So for this we've filtered on the designation types and we've basically added that filtering onto the endpoint and we've also got spatial views that are used in ArcPro as Matt was showing earlier. Right. This is one of the last slides. We've got some other customizations that are kind of quite small, so I haven't given them a whole slide to themselves. Although the letters parts of the workflow were mostly created by Farallon, we did need to make some adjustments based on feedback from the users within GLHER, so that took a little bit of time, but we got there in the end. As I said, we have changed how we do help. So it is we've basically replaced the icon and it goes off to an external site, but it does look at what group the user is in to decide which URL. There are two URLs, so it decides that way which URL to send them off to. We've also because of our legal obligations, we have had to include links to terms and conditions, privacy and accessibility notices, so they've been added into the left hand column on Keystone. And similarly, we were asked for a link back to the homepage. So we've we've added one of those. So I think that's it. We publish our code umm to fulfill the requirements of our licensing with Getty and Arches. So that's our URL [Github.com/HistoricEngland](https://github.com/HistoricEngland) and we're also active on the Arches Project Forum. So if you have any questions or you want to discuss anything just kind of give one of us a nudge on there and I'm sure myself and my colleagues, will be happy to have a chat with you. So that's me. I'm going to hand over to Paul now.

01:54:03:00

Paul Hudson (Historic England)

Thank you very much, Chantelle. Can everybody see and here me? Alright, it's a bit short this PowerPoint bit because I was going to include a lot of sort of before and after screenshots of accessibility work I've done but it's - if it works, it'd be nice to actually show you rather than, and probably easier to show you rather than the look at some screenshots, so I'm just going to cover things like, obviously to do with web accessibility. What is it? Why do we need it? And basically my experience with working on Arches and trying to make it accessible.

So. What is it? Why do we need it? Yep. So make all websites accessible. Umm. Regarding websites and other systems, by other systems I mean things like you know Windows applications or whatnot, it's just a way of designing and presenting web age content or the content so that people with disabilities can use and navigate through the pages and the content. It's basically a common goal to make everything as accessible as possible so one of those things is to be as inclusive as possible. So basically there's lots of people with disabilities and impairments um all over the world. At least one in five people in the UK have a long-term illness or an impairment, visual impairment, or disability. Many more have temporary sort of disabilities, maybe caused by accident or whatever. Such disabilities that can affect the use of a using a website can include auditory, cognitive, you know, making things understandable as possible, perhaps not to just display an icon, but try and be a bit more helpful. Neurological, physical speech and visual. It's also important to mention that a website should be designed to enable the user to use devices with much smaller screen space such as mobiles or tablets. Website content should still be navigable and readable on smaller screens. For example, someone with impaired vision might use a screen reader and

we've been using some software called NVDA. It's free. You can install it and it's incredibly annoying when you switch it on if you're not used to it, it does read out everything or tries to. So basically, yeah, it reads out the content displayed on the screen, there are Braille displays, there's a screen magnifiers, magnifying software. But for somebody who may have motor difficulties, then they might be using a special mouse or not a mouse, just a keyboard, so they they can't, you know, wouldn't be able to click on things they have to use the tab button, either the enter or the space to actually mimic the left mouse click. And also you know there's things like onscreen, keyboard emulators, all that sort of thing, but the there's a whole host of things. In the UK, it's a law and basically we need to adhere to some guidelines and they're – its acronym is WCAG. And the accessibility regulations came into force for public sector bodies on September 23, 2018, where people should be making their websites accessible to at least level A, standards of three levels. I'll explain those in a minute.

So we working actually here at HE, we're trying to achieve AA and AAA in some cases, so level A is like the minimum acceptable conformance. AA is better conformance and AAA is highest level of conformance. When I say things like we're trying to give for AAA if we can, it's just for simple things like uh if you can imagine a button, the contrast between the background colour of the button and the text on the button need to be sufficient enough. It's very easy to change colours using the style sheets and everything. So if we can make it AAA, why not, let's do it. Future proof ourselves. So yeah, basically the the web content accessibility guidelines (WCAG) was created by the W3C. Warning lots of acronyms, which is the World Wide Web consortium. In short, really the WCAG all those guidelines are an organized list of rules that should be adhered to to one of the levels. So basically. Yeah, I mean, it might be worse than noting that I think we're currently working with version 2.1 of WCAG. But there are there are newer versions being worked on which obviously when they come into play we will have to adhere to those two whenever they're published. I don't know any dates on that. I've took it quote- There's a government website I've took a quote off it, so I'm just gonna read it out. It says "organizations that do not meet the accessibility requirement or fail to provide a satisfactory response to a request to produce information in an accessible format will be failing to make reasonable adjustments. This means they will be in breach of the Equality Act 2010 and the Disability Discrimination Act 1995. So. It's quite important, really, that we do this, and I've got some examples and here I was going to do the screen shots, but I'm going to attempt somehow or another - how do you switch, how do you switch from what you're presenting? Just bear with me a second.

Alright, I'm gonna stop sharing that and I'll share another window. OK. Can you see the website?

Paul Hudson (Historic England)

This is a website on stage, you won't be able to access it because it's. It's not there yet. So basically what I was going to do was show you a few examples of what I've done, if using the Chrome Web browser, I mean other browsers have it as well, but so if you just flick that into mobile view it's just mimicking the width and height of the Samsung Galaxy Ultra. As you can see there. But there are other obviously sizes you can go to. Uh Let me do it on this. This is the from the Arches demo. So obviously bear in mind this might be a few versions behind, so a few things might have been improved already, but as you can see. Where's the map gone, I can't see the map, can't even scroll down to it. I can't. I can't get to it. It's just. It's totally gone. The left menus disappeared. There's all sorts of scroll scrolling going on, different scroll bars, all sorts of things, wonderful things. So what I've tried to do is, obviously we can put a lot of media queries. You know, I won't go into the technicalities, but it's a pretty bore for everybody. But so certain screen which you can detect so for example, what happens now is it stacks on top of each other, so we've got the order was search results and then map so when it stacks on top of each other instead of left to right so it goes from left to right to top to bottom. So you've got the resort sorry the results on the

top and then if you keep scrolling down which people are well used to or mobile devices, scrolling up there you can see your map, so you can still get to everything you know. There's a menu there and I'm not logged into. It's not sure anything. You can still see things and you can still get to your filters and advanced searched and all the rest of it, whereas what we did have was pretty abysmal. You couldn't do it basically so that was the mobile issue. We've kind of addressed.

Color contrast. Now that's an interesting one, really. So you can see for an example a resource type button. It does not pass accessibility checks, contrast issue checks now. What you can do is to aid your development is install some wave plugin, install some different plugins, one items called wave. What was the other one called? Arc - Arc toolkits? No. It basically you load the page you want to check, and you press on the icon up there, plug an icon and it gives you a little result. I'm not gonna click on it because sometimes it takes a little while to do, but you can identify bits and pieces on the page. Contrast errors or that sort of thing: this text, these links. They will fail as well. So on here you can see I've made the the background darker so the foreground text displays with more contrast and the same for the text and everything, you can check that there are some lots of websites around in that do this to help, but for example on this demo that the color of that button there, I know it was that and the foreground was white. So there you go. The last demo there and you can see all the levels failing which is not what you want, so. It's up to you. You know, I suppose at the end of the day, what colour buttons you like? And I'm working on some things that might help with theming different things, but you can see when I move this slider to make the blue darker, these fails start to become passes, which is obviously what we want. And if you want AAA, because it's gotta be quite dark, to be honest. But it all passes, so there you go. That's what color I use if I want to be accessible. Tapping here, tapping was another thing, wasn't it? So. I'm clicking anywhere. If you tap now, I know that'll probably be on the login button. But how do you know how? How do you know you're there? Can't even tell. And if you keep tapping ohh, there you go in the search field and then it It's going down to the search results but you- It's not going on the tight, it's making the title a little bit darker, but it's not very brilliant. So what we've done is try to improve that a lot. So if I click on there at the top. And then tap, you can see now it's underlined and it's got a border around it, which easily tells you where you are on the page. And you can just tap around and you can see the top position moving.

So some of these things I found on here. Some of these are simple links, so you can just press the enter key on it and it will open, but certain things like some of these buttons and some of the items in in here, for example in the advanced search, whatever aren't simple links, they're are other containing HTML things like Divs or whatever. We can't tap to it div unless you tell it to, so it's all to do is making it, you know, imagine you haven't got to use of your mouse. You need to use your keyboard. So if you can't tap to it, you gotta make it so you can tap to it. And the other thing I was gonna show you quickly was zooming so. Again, if I click somewhere in there just to give it focus and then press on my keyboard control plus you'll see the all the content getting bigger, which obviously some people may want to make use of, and as you can see, what's happened there, it gets to a certain amount of screen width available and it starts stacking, which eventually when you get to mobile smaller views - you then have to do the big scrolly bit, but at least it's there, and at least you can still see it and navigate it, whereas what used to happen was you would press control plus on this and you can see what's starting to happen. Things start overlapping and being on top of other things. Oh, now it's me search box God and then oh, the whole menus gone there was that gone. And that, oh, there's the map. I mean, you know, so. That's what we're trying to do. All these guidelines are incredibly exhaustive, I have to say, but and I'm not gonna go through them all here, but here they all are. If you ever need to check anything or test against it, we've got some some good test accessibility testers that produce reports and and then we can create ticket work tickets from it and work on it and make sure it's all good. So that's what we're doing. There's also

this I found on the WC website. It's just about it's all about what you know, what is it? Some of it's- Well, I've said already, but it goes into a lot more depth. And this is short video and everything, but that's from the government. So now I'm going to go back. Excuse me a moment. Stop presenting button! Ohh. There we go. Stop sharing. OK, go back to that on to that. There's probably an easier way of switching, isn't there anyway? Next page. No, it's still assuming you can see me.

So my conclusion was basically there's a lot of ongoing work to make things even more accessible than there is now. We've got quite a lot of tickets that have been worked on over the years. I have been working on this for years. It's kind of- what should I say? It's kind of been the bane of my life, but I'm not complaining because, you know, it's my job and I love it. But every time an Arches version comes out, we've had to make sure all my accessibility changes are reflected in the new version. And guess what? Doesn't work, it does for some of it. Some of it, it doesn't. If they've changed anything in the background to do with the web page layouts, class names, all that sort of stuff. So what we're doing now is a lot of collaborative work with Farallon. And we're working together on the version 7 to make the core version have all this accessibility in place so when you get your branches and build your code, whatever hopefully in the future it will be accessible and then when we have an upgrade, all these things will be taken into account. When they do their development. So that's what hope is and then that will obviously minimize the rework. And also because you know all this is collaborative and it's open source, Arches is open source, so we're giving it back to the open source community. So hopefully, eventually we'll all be accessible wherever we are. But if you want to use bright red buttons with purple text, it's completely up to you. But it may not pass accessibility. I know some countries don't have uh accessibility laws yet. But obviously that may change in the future. So yeah, that's me really. Any questions? Is it over to Andy? Do you wanna say anything? No, no. OK, back to the chair then.

Alastair MacIntosh (City of Lincoln Council)

Well, thanks very much. That was umm, I've. I've raised my hand. Uh, that was a mistake. I meant to applaud. Sorry. Consider yourself applauded. How do I take it down again though?

Chantelle Smith (Historic England)

Yeah, you've done that.

Alastair MacIntosh (City of Lincoln Council)

Ohh I'd done it. I've fantastic. That's grand. Uh, well, thank you all so much for that. It's umm, it's just remarkable to see how much work uh you're putting into the Keystone instance, but umm, but I think the the thing that perhaps you know if you will take a moment of criticism, you could have you could have sort of said a little bit more about us just how valuable this work that you're doing is to the much wider UK Historic Environment Record community. You know, I mean, we all have very high hopes that, uh, that that other organizations are going to pick up Arches and run with it. And I think for them to be able to do so the work that you've all been doing and perhaps I might say especially Paul you've been doing is going to be absolutely crucial to that. From the Lincoln side of things we went live in May 2018 which puts us just on the right side of the accessibility requirement, but that's not a situation that can obtain forever, so I'm personally very much looking forward to the launch of Arches-HER so that we can upgrade to that. And actually then then join the accessibility party in that regard because it is a, you know, it's a very important duty for us as a public body. So thanks very much for all that. Does anyone else have any questions? I'd be very surprised if you didn't because there was an awful lot of ground covered there. Azadeh yes, please.

Azadeh Vafadari (MAHSA)

Yes, my question is to Matt about the plugin Arc. Not a plugin. How do you name it? Link up. Is that- so you showed kind of that we can change edit the geometry and replace the geometry. Would the same thing work with the attributes side of the things?

Matthew Jones (Historic England)

I don't think. Not sure you can pipe attribute tables from ArcPro into nodes, but what you can do is directly open an Arches instance in that little browser Chromium. The thing that I was trying to open when it crashed, so once you've either created or edited the geometry in Arc Pro, if you can then essentially open a browser window that's contained within ArcPro but is just Arches directly within ArcPro so you can start editing the record that you've just created or edited within your ArcPro window. So you need never actually- theoretically, you needn't open Arches separately in a browser at all. You could create the - if you were creating records from scratch. You could take a sort of geometry first approach. Create the entire instance using the polygon you've just drawn and then populate the Arches record through the standard resource editor interface, but as a pop up within ArcPro. But I don't think you can populate the resources through the attribute table of a shape file. I'm not sure that's possible now.

Azadeh Vafadari (MAHSA)

OK. Thank you.

Andrew Jones (Historic England)

It not, it's not, it's not. I think no, the complexity. I think you probably discovered around actually being able to convert human readable text. Some of the Arches kind of UUID, the concepts and something I think that is a quite a complex thing that at the moment they've not done, it's just the geometry editing.

Azadeh Vafadari (MAHSA)

I'll also say - from the Chantelle, the extensions and everything that you were showing, they're amazing and we're kind of hopeful that with the codes available, we can pick and choose and try to implement on our versions as well. We have to try and see how that would work.

Chantelle Smith (Historic England)

Yes, well, we'll try and get those up as soon as possible so that we can, because we know that, yeah, it would be useful to other people, but I'm glad that that you can see the potential in them for your, for your project.

Azadeh Vafadari (MAHSA)

Yeah. Thanks.

Phil Weir (Flax & Teal)

I have a couple of questions. So yeah, that was really, really interesting. I'm- Yeah, very exciting. So I guess I'll try and keep brief. But one first one was: On the accessibility work, that's really brilliant. I think also even just in terms of general usability and smaller screens is it's also really powerful as well. We've been looking at a little bit of expanding some of our Cypress testing and wondering if there's possibility to overlap and some of that. So automated front end tests and CI wondering just you mentioned about the retesting process that might make that a little easier. But yeah, so if there's any thoughts on that, I don't know, I'll start with that one.

Andrew Jones (Historic England)

We've we've got a test team that does a combination of tests. I know they have written quite a lot of Cypress tests specifically for the GHLER/Keystone application. We've got kind of a couple of names for it. So they have, they have put together their own Cypress tests, which I guess it would be good to kind of make them part of it. We don't use CI as part of that test pipeline at the moment because our test team is where they currently are and I'm sure that's something that they want to do. But obviously if we could have a more generic set test that would be good. I guess one of the things is we just got because we have quite a few customizations in there at the moment, having it across the board for all Arches instances would make things a little bit complicated. So it could be that there are Cypress test packages per project possibly.

Phil Weir (Flax & Teal)

Yeah, that that makes sense. I mean, at the moment we, we spotted, there were a couple of parallel ones that we pulled into our CI just to test the CI ironically, um. But yeah, that would that would certainly be interesting. Another one we're kind of, we have been working with a mixture of uh, BNG and ING, so our data sets vary, which as I'm sure John could advise is sometimes a little challenging. One question I did have was: do you have ways of keeping the grid references reconciled with the due spatial when it's stored, or is it just is kind of OK we're taking it in and we're translating it? And storing both. What happens if one gets updated or is that? Is that a realistic concern?

Chantelle Smith (Historic England)

Well, that's where we've got those functions between the BNG and the Geojson. So basically, if one of them's updated then it will automatically trigger an update of the other one. And it works you know both ways basically, so that there are ways in the umm, you know, they're the they're correct on both both ways.

Phil Weir (Flax & Teal)

OK. Got it. Yeah, so it's basically whichever way you added it, it'll upped it both. Yeah, OK, I got you. Cool. Thank you.

Andrew Jones (Historic England)

But there are some nuances around whether that will the complexity of the Geojson is though, because obviously one if it goes stuff in the map reference side of things, you'll create a point. But if you then go and digitize the load of features in the Geojson, load it, then just works with the extent of those features. So the center point of the extent and yeah, so it doesn't try and kind of keep track of a single point somewhere in that node.

Phil Weir (Flax & Teal)

Yeah, there's not too many BNG polygon type situations that way. Umm and last for one for me briefly is, uh, reversal relationships. That looks great. I really like that, want to use it. Is that I had not spotted it, but is that something that is- Uh, right, usable and testable?

Chantelle Smith (Historic England)

So it's a scene. It's a report scene. And then you kind of put the whatever the name of the kind of where you reversing to in the main report sort of config for that theme? But I'm happy to chat and show you through things offline if that that would be helpful.

Phil Weir (Flax & Teal)

OK, that's good. I probably feel a bit guilty, but thank you.

Alastair MacIntosh (City of Lincoln Council)

OK, I'm I'm conscious that we are actually getting not very far from the end of the meeting which is half past 3 we're meant to be finishing at and we have still quite a lot to get through. And to that end, I think, um, I'm tempted to, if nobody disagrees wholeheartedly, to bump my very brief presentation about the consultation module until our next meeting. Umm, because I think it's probably a little more important that we hear from Maggie given that she's, I think got up very early in the morning to speak to us today. So umm, does anyone object to that? Marvelous. Uh, that saves you from hearing too much more from me anyway. Right. That being the case, thank you very much, Historic England colleagues, that was really helpful.

02:23:52:00

And now I think we'll pass over to Maggie. Maggie, thanks so much for joining us. What must be a very early time of the morning for you.

Maggie Smith (San Francisco Planning)

Hi yes, it is a little early on a Monday, but I'm really happy to join and see everything that everyone's up to. I would also be interested in that reverse relationship. Yeah, in reports, we're doing a lot in San Francisco, which is where I work. So I work in San Francisco, CA for the San Francisco's Planning Department. And we've been working on our implementation for several years now, but I'm really here on behalf of the Arches US user group, and I can speak a little bit about it. I don't have a formal presentation or anything I can drop in some links to our - we have Google Drive, we keep minutes, we have sort of some resource lists that we've been gathering, but I'm happy to answer any questions. I also don't want to take away from another presentation, so. Yeah. Whatever works all through for you all.

Alastair MacIntosh (City of Lincoln Council)

Well, perhaps, Maggie, if you could just sort of talk us through the, umm, the makeup of the group, you know whether, how, how, how, formally or constituted for example, what your membership is like and you know that some of the sort of how frequently you meet things of that nature? Because I think we've we've been thinking for quite some time and there is an item on the agenda of development of the Arches UK user group, we've been sort of thinking for some time about how we put our group on a more formal basis and I think taking a preexisting model, that's pretty much the be all end all of the Arches community, isn't it? And so, uh, so yeah, if you can talk to us a bit more about that, that would be great.

Maggie Smith (San Francisco Planning)

Yeah, happy to do that. OK. So we started we just kind of started off this way which I think was pretty helpful. So we meet every other month and we meet for just one hour during lunchtime and it's usually the 3rd or 4th Thursday or sorry it's the 1st or 2nd Thursday of the month. And so it's just kind of a standard recurring meeting. And it is only one hour and I think usually by the end of the hour we're like, we really wish we could keep going. So it is it is. I really, really appreciate having like the nice long presentations and like the nice time for Q&A. I think because it is an only an hour, it allows us to like, OK, we'll just- we'll see you in two months. And because we have it, the recurring, I think that really helps. We have I think about 30 to 40 people that have come through, I'd say that there are maybe around 15-20 that are pretty regular attendees and from all different parts of the United States doing and all different stages of Arches implementation, we have LA, which was one of the first organizations to do to implement Arches. And then we've got others that are just interested. Sometimes students are those that are fresh out of school, join, just interested in Arches and sort of what we're talking about as a group. Then we've got the developers of Farallon joins, and then we've also got those that are actually using Arches on a day-to-day basis for their city or for their organization. So we I think we've got a

nonprofit organization and that a couple of them. And then we've got public agencies such as San Francisco Planning Department or other planning related sort of departments on the public side, and I think that there are also some consultants. People that are on the academic side, so really just kind of all over people who are using Arches and in the US or interested in it.

And we do kind of a share. We have a sort of a standard agenda. We do a welcome - if someone is new, we have them in new to the group, we have them introduce themselves and we've got kind of like a member list and then we go into sort of the content of the meeting which we sort of try to figure that out the meeting before or we sort of try to sometimes it's like what is most relevant. We had a great accessibility conversation 2 conversations ago. And then we've also talked about funding and resources, that's been very helpful for us for us and then about sort of the progress of Collector, Arches Collector and then workflows. So lots of different conversations, some instance sharing as well. So it's yeah, it's really what people are interested in talking about and then we wrap it up, Q&A and then by the end of the meeting we just set the next state for the following meeting so that we're like OK we can put it on our calendars and then I send the invite out. So I think that that helps it keep it regular, but it's also sort of the agreed upon we had - we had all agreed on it in the first meeting. So maybe that helps - happy to answer any other questions.

Chantelle Smith (Historic England)

Hi, Maggie. What's the kind of makeup? Is it sort of. Do you have many devs, like developers, come along or is it mostly just kind of users? End users?

Maggie Smith (San Francisco Planning)

I would say that there are a fair amount of devs like a lot of the Farallon team joins and then there are several other developers that join as well. And I would say that that is probably one of the most helpful aspects of the user group because we on the public user side, for us to be able to say is this possible and then a developer to come in like right away and say yes or no, that's a really great suggestion. Let me think about it. And then and then they've also been able to talk a couple times about the roadmap development. So maybe in conversation we're saying, you know, some of the public agencies or those that are using and implementing Arches they- They're saying also, start going down a rabbit hole of like, OK, this is a problem and this is a problem. Then the developers are like, OK, we're addressing that like this way and this way. So that's been really great.

Chantelle Smith (Historic England)

Cool. Thank you.

Stuart Cakebread (Historic England)

Maggie, could I just ask- well, first of all, thank you for coming along so early in the morning. Again, I really appreciate it. Do you get from the meetings any sort of momentum for collaboration between different users about developing new ideas or taking Arches forward?

Maggie Smith (San Francisco Planning)

Yeah, I think that, uh, after the grant and sort of resources discussion, I definitely felt like a lot of inspiration around collaborating more. There was a thought about, like maybe we apply as a user group to a grant or something like that. Nothing has really happened with that so far, but I think getting that conversation started is really helpful. So, so that's where we are with that. It's hard because we're all so busy trying to do our own implementations and then to come back to the larger group. But at least being able to sort of share our progress, I think the probably at least I think the Collector understanding how

Arches Collector kind of hasn't really worked out and San Francisco's experience with that, we were like more than happy to share that with everyone. And then our sort of troubleshooting through that and and what we're doing now, which is using workflows for our infield survey. So I think that as we go through a step with step and especially with accessibility, I think that there is definitely a lot of room for collaboration and continuing those conversations.

Stuart Cakebread (Historic England)

Thanks. Can't hear you, Mac.

Alastair MacIntosh (City of Lincoln Council)

Can you hear me now? Do you know what it was? I thought I was muted and I was pressing the space bar and I was actually muting myself while I was speaking to you. But anyway: What I was what I was saying is I think it would be actually very useful, Maggie, if we could, and I realize it's sort of it's committing one or other of us to to an early morning or late evening. But I think that that sort of having a continued relationship between the UK group and the US group could potentially also be very useful indeed. And I think once we've sort of more formalized things at our end, we could sort of perhaps have a rotating system of volunteers to join you and perhaps vice versa. So I think that would be very useful. Umm does anyone got any other questions for Maggie? Oh, that's really helpful. Thank you. So that's your, that's your minutes. I presume that you've just shared with us there, Maggie, is that right?

Maggie Smith (San Francisco Planning)

That's just our next meeting. I love the idea of, like, a circling like cycling through. It is really helpful that you all record yours. So I yeah, maybe I'm happy to continue to joining. You know if this is a good standing time for everyone like I think this works well for me. And then I can - we can relay back to our user group and see if others are interested in rotating around. And then, yeah, ours I think it's only 8 PM your time. So if that if that's OK.

Alastair MacIntosh (City of Lincoln Council)

That's not too late. No, that, that, that should be fine. That's really helpful. Brilliant. Well thanks very much for that, Maggie. OK, so the next thing on the agenda was updates from members of the group, so I think we've heard from several of our colleagues. I'm just wondering if there are any other people working on projects at the moment. Uh who maybe want to share things that they've been doing? Am I missing any raised hands? Ok. Shall we should we skip that item then? Always bear in mind that if you have got anything that you feel you couldn't quite do justice to a couple of minutes after at the end of this meeting, you can always sort of drop us a line and make suggestions for presentations for the next one. That would, I think that would be very helpful. OK so. Moving on to the next item, which was uh development of the Arches UK user group, so I think is that one over to you now Stu?

Stuart Cakebread (Historic England)

Thanks, Mac. Yeah, I was just thinking you, you know, I was very interested to hear what Maggie was doing with their group or the colleagues in North America were doing with their user group. And I was just wondering what the thoughts are of the group here about having more regular meetings. I mean obviously it all depends on what work is taking place, and we have been rather ad hoc due to various, you know, unforeseen reasons. But I was just wondering whether as a group whether we wanted to put the meetings on a more regular footing. Yeah maybe every three months or maybe every two months? I don't know. I just wondering what the thoughts are. Anybody got any thoughts on that?

Chantelle Smith (Historic England)

Three months might be just because of things you know, summer and- Yeah, that might be a good idea. Looks like the chat that is coming through similarly as well.

Stuart Cakebread (Historic England)

Umm. are we happy with the kind of the length of the meeting? I mean I feel we could have gone on possibly a bit longer. I mean, whether yeah, people want. You know what, I'm not suggesting a whole day. That might be too much. But maybe you know slightly longer going on for another hour, so this meeting was three hours and maybe hours going to half four? Or, more shorter, John?

Chantelle Smith (Historic England)

No, I think you know another half hour or so. I certainly feel like maybe it's just cause we've had so much and I've certainly realized I waffled on quite a bit. So maybe an extra half hour to make it maybe 3 and a half?

Stuart Cakebread (Historic England)

Yeah. I mean, I think maybe it's one of those things we tailor to the presentations, I mean, obviously, you know, not everybody's gonna have things rolling out all the time, so that there might be some times where it's a shorter meeting, some or as it's slightly longer meeting and maybe a bit like how we work with the HER forum, we bank talks so. Yeah, we can think about that. The other thing I was thinking, which is I alluded to when I was talking, asking Maggie about what they do is about more collaborating together as a group. I think there's a there's a strong interest in QGIS as a tool, working alongside Arches and Matt did a brilliant presentation of the ArcGIS Pro link in spite of reluctance or shyness. That's something that we find a useful tool. And it's something that I would be interested in looking at as a QGIS version of that as well. I mean I can understand you know, talk to people about this, the importance of having the Esri version of it because of the use of Esri- various different organizations but the QGIS just to me fits in better with the ethos of Arches. But obviously what I don't think we want is everybody off going and doing their own different version, whether we need to perhaps get a small group together of people who are interested in that and maybe thrash out some ideas. And then once we have a better idea of what we would like and that's what is technically possible, they then comes the big question of how much does it cost to do this. And I think if we've got more people involved with that, then that might be an easier way of funding that. I mean, certain organizations will have access to you know, funding streams that other organizations aren't, just can't tap into but could help in kind. So again, I don't know what people think about that.

Azadeh Vafadari (MAHSA)

We're totally on board and I think umm Junaid has already talked, have you? Haven't you with a few projects, other projects interested? So or maybe at least at the start of the talk.

Junaid Abdul Jabbar (MAHSA)

Yeah, we have been discussing this two years with different projects and also at the last meeting that was the Arcadia meeting that was in person in London. So there's definitely room for collaboration to take it forward.

Susan Freebrey (Jersey Heritage)

We're definitely interested in, in with being that user group or something per key GIS.

Stuart Cakebread (Historic England)

I mean, Maggie, is that something that your users would be interested in as well?

Maggie Smith (San Francisco Planning)

I think I think so definitely again in the same, thought process as just like Arches in general being open source so. I think that's great. Yeah. And maybe as long if we're having some like a participant from each group in the other groups meetings, that can again help facilitate the collaboration like, hey, we're already talking about that or hey, we're interested in that. So I'm really excited about this.

Stuart Cakebread (Historic England)

Well, OK, Perhaps what I'll do later on. Not today obviously, but I'll send out an e-mail and perhaps get yeah, if you if you're interested or you got colleagues are interested, just let me know and then we can. I can set up. I'll try and set up like another meeting with the Doodle poll and we can start working on that. Alright. So yeah, so that's so. So I've gone off the slide, slide sidetracked there, but I mean do what are the other thing I was thinking about is do people think that we need a more formal structure to the group so terms and conditions, that sort of thing, people we invite? I know some organizations like that because their staff, are involved with that, particularly if at some point we went to a more hybrid meeting. I don't know where some people would be interested in in a more of a face to face on a meeting with some hybrid version. Going ahead on, I know some organizations, if their staff, are involved with this, do like a very regimented or of this meeting has set criteria and agenda for it taking forward I again, I don't know what people think about that.

Andrew Jones (Historic England)

I like the idea of- I like doing a face to face at some point in the future, and it may well be that it's because it, you know you, you have an annual kind of option of a face to face Kind of thing, just to kind of meet everyone and have those kind of conversations, which you'll still often can't have in this kind of forum.

Stuart Cakebread (Historic England)

Yeah. No, I was thinking about perhaps, you know, something like an annual opportunity to, yeah, get together, have a, maybe a slightly longer meeting. Rebecca.

Rebecca Roberts

Yeah. And something we've done among the Arcadia projects that we've, we've just set up now was a sort of forum similar to this to discuss the kind of larger scale developments for an interest of the projects, but we've just sent out a sort of simple questionnaire of to give a bit of information about who's in the group. So what your project is, I mean, as of course, we're all Arcadia funded, but I wonder something that would be useful for maybe this group would be, you know, what's your project, what's your funding, who are you funded by and how long is your funding for and maybe how many developers you have and who they are? So just we get a bit of a profile of you know the skills and the people involved in in the group, it might be useful. I can share. We just did it as a Google form but I can share that as a template if that would be something that might be of interest to sort of have an idea of who's who and you know that I think it's there's so many ranges of skills and things that people are working on and perhaps we don't know each other.

Stuart Cakebread (Historic England)

Yes. No, that that would be great, Rebecca. I appreciate that. Thank you. Ah, Phil.

Phil Weir (Flax & Teal)

Uh, yeah, I think, uh John's mentioned this in the chat as well, but I'd be curious if people are coming over to Belfast for the European archaeology event. A certainly I know a couple of people who've involved in this group have mentioned they might be over and I think I think some, you know, there might be some socializing of Belfast that occurs at that point. I'm certainly planning and trying it is very convenient. But yeah, if that's lines up in terms of timing for something hybrid, we can do not for anybody else. We've got some space at least.

Stuart Cakebread (Historic England)

Thanks.. Anything ohh-

Azadeh Vafadari (MAHSA)

Oops, sorry. Yes, that's me. No, I wanted to ask some when Maggie was saying that there are Farallon people involved in their meeting and I wanted to ask and see how everyone feels here, that if I know what the time difference it will be different but not all the time at our meetings, but maybe kind of have a specific at a specific meeting towards the end of our meeting, ask one or two of their staff to join us kind of for these things that you were saying, Maggie, in a kind of unofficial way that people have questions and they just jump in and say, yes, you can do this. No, you cannot do that or it's in the pipeline of things to do kind of conversation with them. Yes, just a thought if it's something that we can do.

Andrew Jones (Historic England)

I'm sure that- I'm sure they would, because that we meet with them, don't we, Stu? Kind of later on in the afternoon. So certainly myself and Paul at the moment, we have meetings kind of half , half five, which corresponds with a with a sensible time of the day. You know, caffeinated part of the day for them. So I'm sure Dennis would be more than happy or maybe it would be great to get some of the other developers. That sounds like you, you you're fortunate to get over in the states there, Maggie, to have them included as well and kind of go through some of this stuff because you know the stuff they do is really good. And I think hearing it from the horse's mouth is often really, really useful.

Stuart Cakebread (Historic England)

We can certainly ask them and see about that and perhaps you know again that can be one of the spatial locations where we shift to the timing of the meeting a little bit to accommodate uh their their attendance a bit more. I'm conscious we are slightly over time. So I think I'll pass over to Mac.

Alastair MacIntosh (City of Lincoln Council)

So I suppose it's just the last two things. Are any other business that anyone wants to raise? You have a very short window. Stu.

Stuart Cakebread (Historic England)

I think it's about time we got rid of this secretary, he's rubbish it's about time, we need someone young and dynamic to move it forward and support this wonderful chair. Who would be taking on because, yeah, he's he's got visions so. So yes, basically if anybody would be interested in taking over the role of secretary, it's not too arduous. I can just about do it. So I'm sure that the rest of you are more than capable of doing a much better job than I have done so far, so if you'd like to volunteer now. If you've got burning desire to add that to your CV. Let me know offline that would be great. Thank you very much.

Alastair MacIntosh (City of Lincoln Council)

OK. And when should we meet again? Date of next meeting. So I think we said quarterly from here on in. So that would take us to uh July, wouldn't it? Middle of July? We could potentially bring it forward a little bit because that is getting towards the school holidays, isn't it?

Stuart Cakebread (Historic England)

I would say early July, I think. Just my own personal benefit.

Alastair MacIntosh (City of Lincoln Council)

Well, why don't we set up a doodle poll again? But umm, but uh, but narrow it down to those UM to that. Maybe the last week in uh in June, the first week in July and then see what we can pull out of the bag for that. OK, brilliant. Well, thank you all so much for joining us. It's been very heartening to see just how many people have, uh, uh, sorry, I was wrapping up, but somebody put the hand up there. Neil. Griffin, not Smith. Was that a mistake in hand? I'm going to assume it was. OK. So thank you all very much for coming and especially to Maggie for uh for joining us. UM, uh. Well, I mean, you didn't come a long way to join us but. But thank you for getting up early to do so. That's much appreciated. And thanks to everyone who gave presentations. They were, they were really, really very useful and and I'm very much looking forward to seeing how Archers develops in the UK over the next over the next three months and hear more from you all then. Thank you all very much indeed. Take care.