

ICA 39<sup>th</sup> Conference

SESSION FOUR

**HORSES FOR COURSES-PROCESS INTEGRATION  
USING EXISTING AND EMERGING TECHNOLOGY**

**PHILIP O'REILLY  
Ireland.**

Thank you. I work for the Department of Agriculture and Food which is shortened to DAF on occasions, so when I refer to DAF I am referring to the Department of Agriculture and Food. The Department of Agriculture and Food was, in fact, established in 1900; 105 years ago. So it is the oldest Department of State in Ireland, it predates the foundation of the state itself. Our mission is to lead the sustainable development of the competitive consumer focused agri-foods sector and to contribute to a vibrant rural economy of society. The department has responsibility for both policy and operational matters for both agriculture and the agri-food sector which are very important to the economy of Ireland. The department is also the paying agency for EU cap payments so in that regard, it pays out some 3 billion Euros in direct payments to farmers. Now the remit has changed somewhat over the years and in recent years, food safety and animal health has continued to grow in importance and more recently, forestry has become more important than it was because of its link to rural development, and also its link to sustainable energy supply.

So my objective today, what I want to cover, in considering first of all the technology vignette, I wondered which technology would be of most interest to government agencies in their implementation of e-Government or u-Government, or m-Government or whatever you wish to call it, and the obvious answer, of course, is that this depends, it depends on the constituency being served, which customers you are serving, who are the people being served, how complex are their needs. Do they use sophisticated technologies on a daily basis? Which technologies are they most familiar with, the most comfortable with? Of course, it also depends on what excites you. Does new flashy big exclusive technology excite you? Or are you more excited by a breakthrough in harnessing say, consumer technology, or general technology to give big gains for customers, for agents? Particularly by allowing customers to use their own channel of choice, whatever that might be. So what I was going to look at was three technologies that are used in DAF to integrate processes of external customers or our own field staff. I wanted to highlight the importance of customer or user's technical skills and familiarity when choosing a technology to integrate these processes. I wanted to highlight how, depending on the user being served, simple consumer technology can sometimes yield the best results.

First of all, I just want to flick back to DAF's overall e-Government philosophy. I mentioned earlier that DAF has both policy and operational responsibility so it is a very large operational organisation, with some 4 ½ thousand staff between vets, agricultural inspectors, all of these sorts of people. So therefore most of what DAF actually does in e-Government is about integrating processes rather than simply

providing information. We are concerned with integrating internal business processes across business units, and integrating external processes into our own core processes. So our overall e-Government philosophy is quite aged: it goes back about 5 years to the earlier days of e-Government and it is based on a few principles that we find useful right up to this day.

The first principle that we operate on is e for eliminate. The idea here is that we don't introduce an e-version of a transaction where we can eliminate it. When we put our minds to it, we can often source the information elsewhere in our own organisation, or in other organisations without the need to have the customer provide it. The next, and it is a linked principle, collect information once and get it right. Multiple collection of information is a prime source of inefficiency for government departments and for customers and it is a source of errors and inconsistency, so integration of systems is key. Next, it is useful to remember that even back then, when everybody was talking about getting a presence on the web, and putting out websites and all that, that e doesn't necessarily mean worldwide web. So don't limit the focus. This has served us well over the intervening years and we got great value from legacy links to our meat plants and stuff like that, and technologies like SMS which happen to be the channel of choice for many of our customers. And finally, when it comes to implementing e-Government, automate the whole process, not just the interface and what I am including here is including the customer's process. We have generated major savings for our customers as well as ourselves by integrating with, and automating the processes for tag vendors, meat plants, farmers, forestry agents and others. And to maybe emphasise the point here, automating the interface which was popular in the early days of e-Government really all it does is gain very little. It saves a few cents in postage and maybe 24 hours in time. However, by integrating e-Government with our own core organisational processes, well then we can have transactions verified in real time and we can respond in real time where appropriate. So therefore the department, DAF, like any other department can gain quite an amount in both efficiency and in control.

Next, of course, the proper goal should be integrate where possible; e-Government transactions with our own core business processes and with those of our customers or agents, and if we do that we can change the process and everybody gains: the department and the customers. Therefore, integration, in our view, is the key to e-Government.

In tackling integrating, however, for e-Government we have to realise that our customers or stakeholders fall into a number of groups. For us, they fall into three main groups: firstly we have those employees of the department who happen to work outside the office, they work out in the field, and traditionally have been isolated somewhat from the department's IT systems. Secondly we have agents of the department who do some work on our behalf or in some cases, agents of the customer who actually represent the customer to us. And finally we have external customers who, in our case, can be further split into farmers and corporate clients who have very, very different needs. I won't go into the general public because that is the same really for any organisation. So the point here is that these are different customers with different needs, and different skills, different technological skills. So, again, it comes back to what technologies are these groups comfortable with, and familiar with. The thing to remember here is that our customers, despite what we might think, don't spend their day interacting with us, or interacting with government for that matter.

They have other things to get on with in their lives so the question here is what technologies, what techniques do they use in getting on with their daily lives from day to day, whether it is social activities or business activities, and this can be a good pointer for us.

I just brought this table – there is no need to look at it in detail but on that I have drawn up a subset of the technologies that we use to integrate external processes with our own. I have put up just 5 technologies there. In the case of web servers, for instance, we use this in integrating with our outsource call centres which is fine because these companies are technologically very competent and they are capable of integrating their systems with ours. In the case of online web based digitising for, say forestry companies or agricultural agents, well these are corporate companies with GIS skills so that fits okay for them. In the case of XML we use that for integrating with say, private veterinary practices with animal type vendors, and these tend to be small businesses; they are used to operating PC based systems so this suits for their integration. We found that using technologies like WAP and SMS to interact with our field inspectors or with farmers, neither of these are big PC users, they don't spend their day sitting at a desk, but they are heavy users of mobile phones so these technologies, in particular SMS, would be very familiar to them and moving to WAP is not a big step for them.

So I am going to look at three of these in a little more detail, and how they are used in the organisation: online digitising, XML and WAP so to take a sophisticated one, a less sophisticated one and a consumer one. So if I look first at online digitising using a technology called iSMART – this is a technology from a company called Espatial, well, DAF uses this technology to develop spatially enabled applications for both internal and external access. They are all browser based, and they include systems that are linked to LAN or LAN parcels. I am going to take an example of a forestry application called FIMS: Forestry Industry Management System, and this allows forestry companies applying for grants for forestry plantation to construct and submit their applications, including all map work online rather than drafting this on paper and drawing onto paper maps. So this is what it looks like, it is a bit of a customer as presented there. You won't be able to see all of the details but you get the idea. What you are looking at there is, in that particular screen, you can see the auto photography of the land, it's the corrected, re-shaped photographic representation of the land being flown over by a plane. And on it, also you will see some land plots and you can see a sort of a yellow box there somewhere, and you can see a red line which someone has digitised in a plot. So, to submit an application, a forestry company accesses the department's database, goes to the particular geographical location, redlines the plot to be submitted using the mouse and the area involved, the area of that plot will be automatically calculated and filled into the application. The company inputs all their attributes, such as the tree species to be planted or what-have-you, and all details are saved onto DAF database, and can be amended as desired. So when the company is satisfied with their application they submit it. The important thing about this is that while doing the map work online the company can see any other of the layers of spatial information of the department. So, for example, they could see special areas of conservation, they could see heritage monuments and things like that, so they can see immediately – it will stop them from overlapping on this; so it says well hold on, you can't plant there. It avoids unnecessary rejection of applications and more importantly, for a company like that and their customers, it avoids the expense of

actually preparing an application to submit only to have it rejected. So this is a big advantage for them as well as for us.

Similarly if the user wants to do very detailed line work, very detailed polygons, they can do this by inputting x and y co-ordinates that they have taken from a GPS or whatever. They can do that, and they can amend line attributes so they can go to whatever level of detail they wish. To look at the environment in which the technology has to operate, what basically we needed to be able to do was to integrate spatial capabilities at every tier of our end-tier applications. We needed to integrate business and spatial data in the database so we could use Oracle, which is our chosen database, or we could use Oracle Spatial for this. We needed to integrate, to provide spatial functions for viewing, for editing, for querying, etc in the application server, and again, we could use a standard Oracle application server for that. We also needed to support a variety of user interfaces and devices including web applications, desktop or window-style applications which will include mobile use which could involve being offline with occasionally being connected. Our applications needed to be able to integrate with other enterprise applications such as ERP systems or with legacy GIS systems to get online map work. So we needed the tools to build and deploy spatial applications to support all of these cases, and the structure is as represented there on that slide.

So what does the technology actually do for us in this? Well, what iSMART does is that it provides the layer between the Oracle database and the browser, and it allows redlining or digitising, using either the cursor and mouse or using x and y co-ordinates. What it does, more importantly for us, is that it captures our business rules regarding spatial data so that the application can automatically alert the user to a rule infringement, such as an overlap onto some of the areas I have suggested or it can prevent an update where there is an infringement of the rules, and reject the transaction, or it can kick off another set of rules or actions. This allows us to have all of this in a single application on a single application server for both the spatial and the business logic, and it is simple in this way for us to implement atomic update transactions, where we update the spatial information we know that the business information related to that is also consistent and updated. So it allows us to keep all of that in sync.

The impact of using this type of web technology is because it is based on a lowest common denominator in terms of interaction there are no big file downloads to the client. There is no specialist client side GIS software and there is no downloading of proprietary software. It uses open standard-based platform independent architecture rather than any proprietary GIS infrastructure, so the customer can mark up or redline their individual process and plots directly to the database while viewing and overlaying existing layers of our spatial information. The accuracy of each forestry planting application is greatly enhanced and the document turnaround, as a result between the customer and the file service of our department is greatly reduced. The other thing is that the customer can verify the application they have made by printing the redline map over an autophotographical layer very much like the screen I showed you earlier which has a picture of the land, so it is very easy for the customer to see, oh yes, that is correct, that is exactly where I planted all of those trees and all of that.

The other important feature from the point of view of deployment for us in a technology like this is that standard internet browsing bandwidth is adequate for full

functionality so our inspectors, who are often located very far from our offices can access this from their home and have full access to it. It also allows update access from very basic devices including PDA's or whatever, if the screen size is adequate to do that but it certainly allows access either for enquiry or for update. So the key benefits for the departments are being a web-based architecture, it allows easy access for the department's customers, it supports future role out of mobile devices such as portable data entry by our forestry inspectors, because it is integrated with the GIS, it enables payments to be accurately generated directly from the digitised areas so there is no inconsistency there. And it meets the EU regulatory requirements in relation to cross-compliance, so in other words the EU want to know that if we are paying out a grant in relation to forestry the land that is being paid on doesn't overlap with some other land that is meant to be used for something else, another agricultural scheme for instance.

So what is the limitation of the technology? Well, probably with technology like this, iSMART could probably be best described as GIS light – it's targeted at business applications that needs spatial functionality. So it would not have the GIS analysis capability of more traditional GIS products. However, since the spatial data is stored in open Oracle format for those specialists that need to do that they can use other GIS products and access directly the database and do that sort of analysis, but for our normal processing of applications and for the normal processing that goes on by our customers we don't need the heavier GIS technology but that is a limitation to be aware of.

I move onto the second one, the technology example which is the use of XML for exchange and integration with private veterinary practices for disease testing. This relates to the department's animal health computer system. The animal health computer system is really split into two, there is an internal, Intranet application for department staff and there is an external, Internet application for private veterinary practices which refer to us PVPs. This is referred to as PVP link. The following two slides are to illustrate the workflow between the two, between the veterinary practices and the animal health computer system, or AHCS. First of all, a vet in a private practice logs onto the AHCS over the web and checks if there are tests listed for him or her to be carried out for the department. The vet submits a weekly itinerary of the test that he or she has planned and then just before heading out in the test the vet downloads herd profiles which are details of all the animals in XML and the vet then downloads this to a handheld device to go out and carry out the test. The vet then carries out the test and captures the test results on the handheld. Then the vet uploads the results from the handheld device to the PC and then to our AHCS in the department as an XML upload. Then if the brucellosis test which are different, they require a blood test the vet prints off the blood results and sends them with the samples to the brucellosis laboratory that, in turn, input the results directly to the department. And then the vet signs off the individual results and sends off the tests on the way up.

Features of PVP link in XML? Well, it integrates existing vet practice workflow, it dramatically reduces paper for the vet because that can become quite voluminous, these herds can have eighty, one hundred animals each and it integrates with the vet's chosen practice management system because they will have different software that they will have chosen to manage their practices and with their chosen hand-held device it dramatically reduces the paperwork for the department and frees up staff to

do other work. It increases the information collected because we have got detailed results for each animal and furthermore electronically collected data can be used to verify your animal movement database, improving control and saving effort for both the farmer and for the department of agriculture.

The thing about this, the proof of the pudding is that we have got extremely high uptake by vets. The system was only rolled out in February 2005 and already we have got 95% voluntary uptake by veterinary practices.

The third one which is a simpler technology for we are down to consumer technologies here is integrating the work of our field inspectors, I have chosen this one using WAP this is for on the spot collection of farm inspection results and what happens here is that the enterprise system for these schemes actually runs risk analysis and what it does is it sends a report to the inspectors. The inspector notifies the farmer that he is going to carry out an inspection. He goes and carries out the inspection, he notifies the farmer of any transgressions or errors or whatever arising from that and then the inspector inputs his own code, the herd number and the results and confirms this over WAP.

So the results are sent directly to the department, they are recorded on the enterprise system and the management information is available on the intranet immediately.

So before we introduced WAP the inspector would carry out the results, write up a report and drive back to the office. Now in many cases the inspector might only visit the office once a week or less so there were significant delays involving getting these results on to our enterprise system whereas afterwards he carried out the inspection, he has the phone and it is done immediately.

So the features of the WAP application is that it is a simple existing consumer technology, the cost of development was negligible, the cost of implementation negligible. There was no hardware costs at all because our inspectors all had standard Nokia phones (sorry Sweden – one for Finland there) simple to use. And it took about an hour to train an actual group of inspectors. The other thing is a very, very high voluntary uptake and no support problems.

So now in summary, our choice of technologies to integrate external processes is dictated by the complexity of the requirement and the environment and skill levels of the particular user base.

Sophisticated spatial technology has given great gains for the forestry companies and for the department where this was ideally suited for the task and customer base because these companies have a lot of GIS skills.

XML on the other hand allowed private vets to integrate what we were doing, our process with their own practice management software and integrate that with the department's animal health system. However, on the other hand using simple consumer technology such as WAP greatly reduces implementation effort and cost. It reduces training effort and consequence staff downtime which is an important cost. It reduces the ongoing support costs and increases the uptake, and ultimately the success of the initiative.

So I come to the proposition that I put in the beginning. When it comes to a choice of technologies for integrating processes, particularly with our external customers it is a case of horses for courses. Thank you very much.