Online Free School Meals as a cloud-based solution: Three case studies of its use in England.

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Abstract
Online Free School Meals (OFSM) was a transformational programme supported by the Department for Education (DfE) and implemented by Connect Digitally in England and Wales in 2010. The full process is documented in Strickley (2013) but briefly consists of a web portal which, based on the three criteria of surname, date of birth and National Insurance Number (NINO) or National Asylum Support Service (NASS) reference number, can check if a parent/carer qualifies for the benefit of Free School Meals (FSM) for their children.
The process is performed using a system called the Eligibility Checking Service (ECS) which matches the three criteria above against data held in three central government databases, namely, the Home Office, the Department for Work and Pensions (DWP) and Her Majesty's Revenues and Customs (HMRC). A decision is normally received in seconds.
The system removes the paper evidence required to prove eligibility (DfE 2013a) thereby creating administrative efficiencies, the removal of the stigma for parent/carers of making a personal as well as giving quick turnaround of a decision, audit of eligibility continuation and a free school meal for the child within days of an application.
Whilst the use of the ECS has been an overwhelming success, with usage by over 150 LAs across England and Wales, most Local Authorities (LAs) have stopped short of the full web-based system in which parents can apply directly via a web-based form rather than via the LA or the school. The reason for this lack of further development has been the perception of a lack of cost benefits caused by a lack of technical expertise, scarce resources and server and development costs.
This paper describes how these issues involved in creating a full web-based system, outlined above, were overcome by developing a generic cloud-based solution that could be tailored to the specific needs of each LA or school (hereafter just referred to as LA).
The paper goes on to look at the general structure of the solution and examines the experiences of three types of user: an academy consortium, a single school and a large LA to illustrate the adoption, implementation, usage and benefits of such a system.
It concludes that a cloud-based system is cost effective in removing the administration of batch FSM ECS checking for the LA and school and as a result of lowering the stigma of applying even further can result in an increase in application and benefit receipt. This has resulted in significant financial advantages for schools and LAs as a result of additional funding based on FSM eligibility such as Pupil Premium, early year entitlement and free summer school places, in addition to ensuring value-added performance indicators are more accurately calculated.

Keywords
Free School Meals, Stigma, Eligibility Checking System, Cloud, Online

BACKGROUND
The provision of FSM for children within England and Wales requires that the parent/carer provides evidence that they are eligible based on a number of criteria.

From April 2012 these criteria were children whose parents were in receipt of certain support payments (Children's Food Trust, 2013).
The OFSM programme was supported by DfE and implemented by Connect Digitally in England and Wales in 2010. The full process, documented in Strickley (2013), consisted of a web portal which, based on the three criteria of surname, date of birth and NINO or NASS reference number, can check if a parent/carer qualifies for the entitlement of FSM for their children.
The process is performed using a system called the ECS which matches the three criteria against data held in three central government databases, namely, the Home Office, DWP and HMRC. A decision is normally received in seconds.
The system removes the paper evidence required to prove eligibility thereby creating efficiencies and removing the stigma for parent/carers application (Children's Food Trust, 2013; Storey and Chamberlain, 2001; Granville, 2006) as well as giving quick turnaround of a decision, audit of continuing eligibility and a free school meal for the child within days of an application.
As (Strickley 2013) describes, use of the FSM ECS was quickly adopted by LAs and resulted in large efficiencies for schools and LAs as a result of no longer requiring paper proof of eligibility and through continual audit of those eligible.
However, without moving to the full web enabled stage (Stage 4 as described by Strickley) the system was not as streamlined and stigma-free as might be due to the parent/carer being required to provide a paper application (although no paper evidence) to the school or LA and the need for the data to be input into the ECS (via the Portal) by the LA periodically as a CSV file; often generated and stored in a spreadsheet.
At the time of the Strickley, 2013 paper only 10 LAs had taken the transformation to the full web-based solution. This was because for an individual LA the costs of developing a web service based solution were high compared to the added benefits that such a system was perceived to generate; assuming that the technical expertise was available to the LA in the first place, which in smaller LAs might not be the case. These costs could generally be assigned as:

- Designing the web-based public facing form.
- Generating the code for the form and hosting it.
- Developing the web services code to communicate with the ECS.
- Obtaining accreditation for these web service calls from the DfE FSM Support Desk.
- Communicating the eligibility outcome to the parent and school.

Supported by the work done by Connect Digitally with respect to the OFSM programme, an independent development company, Software for Data Analysis (SDA, 2013a), in partnership with the author developed a solution for the support of OFSM using web services which would help remove these obstacles of cost and resources and enable the full system to be implemented through the following initiatives:

- Creating a generic web-based public facing form that could be adapted to the look and feel of the LA whilst still keeping the basic structure and functionality.
- Using the same web service calls for every form instance.
- As a result of 2 achieving accreditation from DfE with very little code change.
- Creating a generic email communication system.
- Developing interoperability with the school Management Information System (MIS).

- In addition a generic back office system was created for the LA, school (or both as appropriate) where the eligibility check results could be viewed.

By holding both the application form and the back office systems on a cloud-based system it was possible, with very little adaptation of the generic model, to give users access to the results of eligibility applications made by parent/carers for their children.
Development began in May 2011 of a cloud-based solution and the initial prototype was available in early 2012 with the first users implementing between May 2012 and April 2013. These early adopters are the subjects of the 3 case studies.

RESEARCH APPROACH

It was decided to look at three distinct groups of users that were using the system, an LA (which included all the schools within the LA), a single school and a consortium of schools (academies) that were geographically disparate.
Although there are now three large LAs, several single schools and consortia using the system, with as many waiting for implementation to commence, it was decided to focus on the first users of each of the three category types so as to give the study more maturity in what was a very short time period.
The case studies utilised semi-structured interviews with the users (a selection in the case of the LA and consortium, based on availability) and administrators, emails received as a result of the process, support calls and statistics before and after implementation.

IMPLEMENTATION

As explained in “background” the process was intended to be relatively seamless. This section briefly describes the steps involved in creating a system for any type of user. It also examines the various components of the system.
The system was promoted using existing contacts within LAs using a demonstration system via a dedicated web page (SDA, 2012b). Costs were calculated on the size and status of the user and the number of FSM pupils based on government statistical data, but were tailored to the existing conditions of austerity within the UK at the time. As such an “average cost” would be in the region of £5,000 per LA and £500 for a single school.
Once agreement was made with the LA implementation was via the following steps:

- Accreditation from the DfE was sought via the company in partnership with the host LA.
- A URL was assigned for the application form and back office functions.
- A list of schools and user details was supplied by the LA.
- Any existing FSM data was supplied in a format defined by SDA for import into the new system.
- LLPG data was supplied by the LA for the address checker. (Where this was not available a National Address checker was available at extra cost.)

Once this was arranged the application URL was given to LA with an LA back-office and school back-office both accessible via the web. These three components are described in the “components of the solution” section. In addition, user guides were also distributed.
These processes generally could be achieved within 2 weeks.
As described above, the system is cloud-based. Whilst this makes for major efficiencies, with respect to upgrades, bug fixes and speed of implementation, it did cause concerns around security. Hence the section on secuirity deals specifically with this area.

SECURITY

Any system needs to be secure but one that utilises cloud technology has to be more so. The company, SDA, were chosen to provide the highest level of data security and comply with all appropriate regulations and codes of practice.

In particular, SDA had extensive experience in providing and managing systems involving the transferring and handling of large quantities of personal data, for example, the DfE's National Pupil Database (NPD) and Key to Success (KtS) service. In addition to working on many projects and services for the DfE, SDA also worked for many other central government, local government and non-departmental public body organisations.

Only trained SDA staff, with experience of handling personal data, were permitted to access the OFSM system. All SDA staff were cleared to Baseline Personnel Security Standard and had Enhanced Disclosure and Barring Service (DBS) clearance.

The SDA servers are located in one of TelecityGroup's data centres in London. TelecityGroup is the leading operator of network-independent data centres in Europe and all of their data centres are certified to the ISO 27001:2005 (Information Security Management) standard and have Payment Card Industry Data Security Standard (PCI DSS) accreditation. Physical access to the data centre is controlled by biometrics and access card and the centre is fully staffed for 24 hours every day of the year.

Intrusion detection mechanisms (both within the OFSM domain and between the OFSM domain and connected networks) were in place to identify potential attacks. The OFSM service also has mechanisms in place to detect suspicious activity and to identify suspected multiple applications.

Information security events were reported through appropriate management channels as quickly as possible. Management responsibilities between SDA and the LA were established to ensure quick, effective and orderly response to information security incidents.

The OFSM service also incorporated reliable user authentication, including measures concerning password strength, renewal and re-use.

Audit logs, recording the activities of all users, exceptions and information security events, were produced to assist in future investigations and access control monitoring.

THE COMPONENTS OF THE SOLUTION

The OFSM system consisted of two major elements: the public facing application form and a back-office which collated the results of the application for schools and LA.

Application form

The application form was a generic transactional web form which consisted of 5 major sections.

- Home screen: General information and the choice to start a new application or amend an existing one (requiring a unique reference and applicant's date of birth).
- Declaration: A screen explaining the general requirements for eligibility, including legal and essential information such as privacy notices and data protection information.
- Parent/Carer: Details of the parent/carer making the application (or for whom the application for eligibility is being made). In particular the legal surname, date of birth and NI or NASS reference numbers as these are used in the

eligibility checking process. In addition, address information, relationship to the child and email address are collected

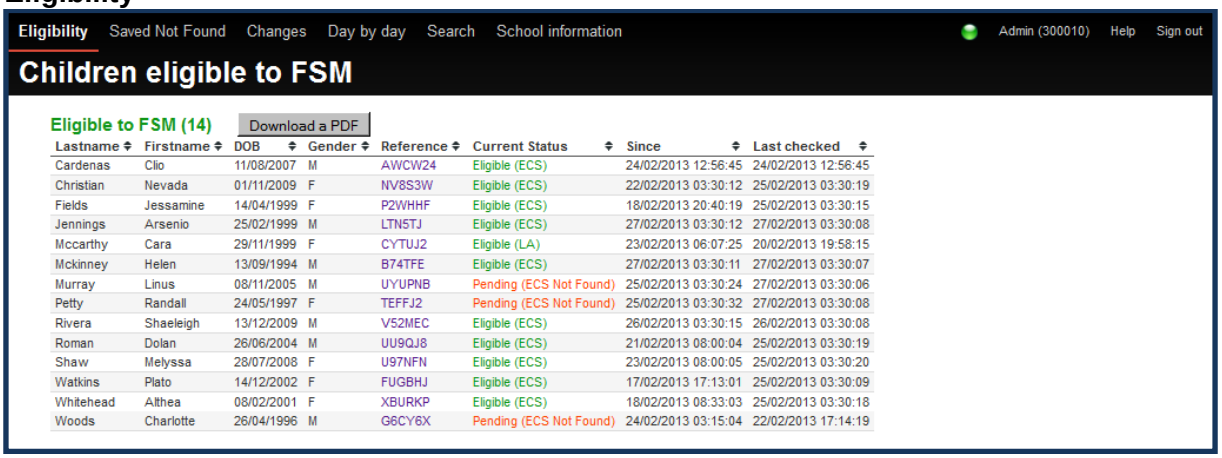
- Child: Details of the child/children including their current school. The school is essential so that the application can be seen by the appropriate establishment.
- Submit: Submission of the information above, to the ECS, with electronic declaration of accuracy to ensure due diligence against fraudulent applications.
- End. Almost instantaneous outcome of eligibility check is given to the applicant together with next steps. In addition, an email (if address supplied) is sent to the applicant and at the end of each day the school is sent an email to inform them that there are new eligibilities in their back-office system.

Upon completion of the form the result is stored in the cloud database and is viewable through the LA and school back-office functions.

School BackOffice

The school back-office is a cloud-based application accessible from any browser that allows the school to examine applications made for FSM eligibility by parents for children in their school. These may be viewed under a series of menu items:

Eligibility



Lastname	Firstname	DOB	Gender	Reference	Current Status	Since	Last checked
Cardenas	Clio	11/08/2007	M	AWCW24	Eligible (ECS)	24/02/2013 12:56:45	24/02/2013 12:56:45
Christian	Nevada	01/11/2009	F	NV8S3W	Eligible (ECS)	22/02/2013 03:30:12	25/02/2013 03:30:19
Fields	Jessamine	14/04/1999	F	P2WHHF	Eligible (ECS)	18/02/2013 20:40:19	25/02/2013 03:30:15
Jennings	Arsenio	25/02/1999	M	LTN5TJ	Eligible (ECS)	27/02/2013 03:30:12	27/02/2013 03:30:08
Mccarthy	Cara	29/11/1999	F	CYTUJ2	Eligible (LA)	23/02/2013 06:07:25	20/02/2013 19:58:15
Mckinney	Helen	13/09/1994	M	B74TFE	Eligible (ECS)	27/02/2013 03:30:11	27/02/2013 03:30:07
Murray	Linus	08/11/2005	M	UYUPNB	Pending (ECS Not Found)	25/02/2013 03:30:24	27/02/2013 03:30:06
Petty	Randall	24/05/1997	F	TEFFJ2	Pending (ECS Not Found)	25/02/2013 03:30:32	27/02/2013 03:30:08
Rivera	Shaeleigh	13/12/2009	M	V52MEC	Eligible (ECS)	26/02/2013 03:30:15	26/02/2013 03:30:08
Roman	Dolan	26/06/2004	M	UU9QJ8	Eligible (ECS)	21/02/2013 08:00:04	25/02/2013 03:30:19
Shaw	Melyssa	28/07/2008	F	U97NFN	Eligible (ECS)	23/02/2013 08:00:05	25/02/2013 03:30:20
Watkins	Plato	14/12/2002	F	FUGBHJ	Eligible (ECS)	17/02/2013 17:13:01	25/02/2013 03:30:09
Whitehead	Althea	08/02/2001	F	XBURKP	Eligible (ECS)	18/02/2013 08:33:03	25/02/2013 03:30:18
Woods	Charlotte	26/04/1996	M	G6CY6X	Pending (ECS Not Found)	24/02/2013 03:15:04	22/02/2013 17:14:19

Figure 1: Eligibility screen

The screen in Figure 1 shows the list of currently eligible children in the school. The list may be re-ordered by clicking on the appropriate column heading, printed as a screen dump or downloaded as a PDF. In addition clicking on the reference brings up a screen containing the complete application data set as shown in Figure 2. Here various functions may be performed such as adding siblings, transferring a pupil's eligibility status to another school using the same system and editing the existing application details.

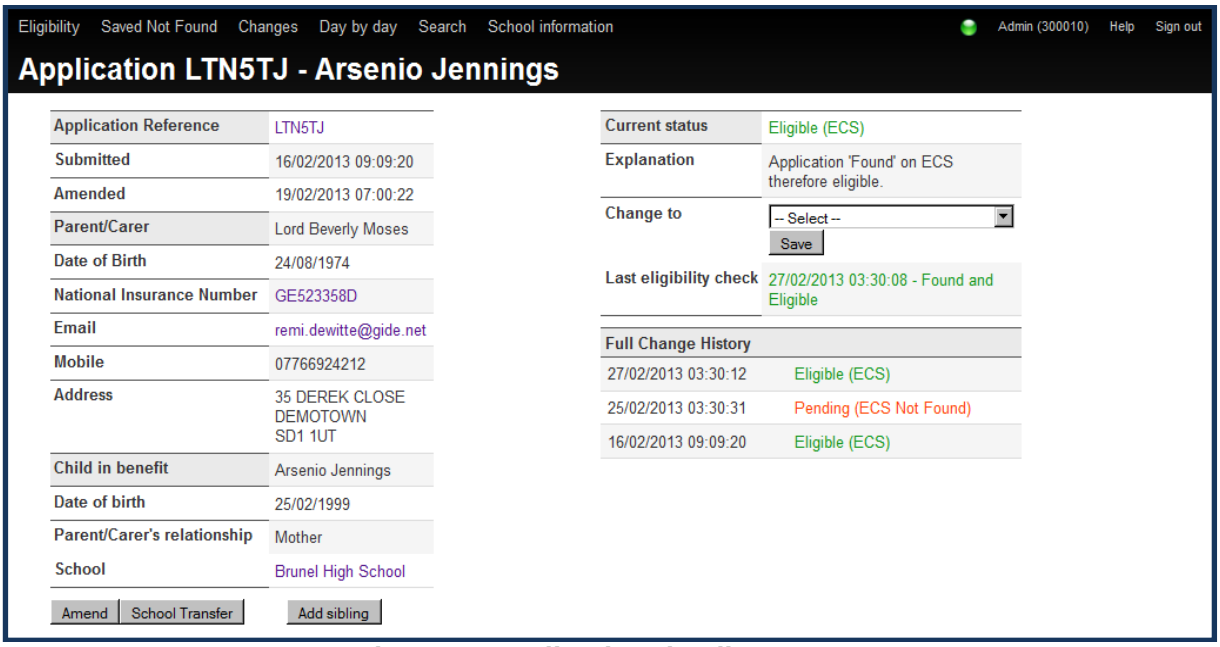


Figure 2: Application details

Saved Not Found

This menu item allows the non-eligible pupils to be viewed as a single view.

Changes

This screen shows all of the applications which have changed status in the recent past (e.g. last 5 days).

Day by Day

This screen displays the new applications and changes, in daily lists, over the recent past (e.g. the last 5 days).

Search

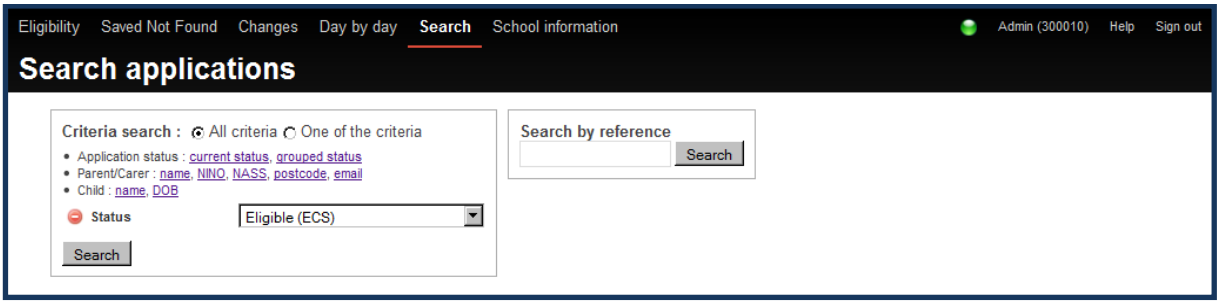


Figure 3: Search screen

Figure 3 shows the search menu item by which applications may be searched for based on a single or multiple criteria. In addition this screen may be used to obtain a CSV file output of the results of the search.

School Information

Figure 4 shows the school information screen by which the various administrative functions, such as adding users and changing the school details, may be accessed.

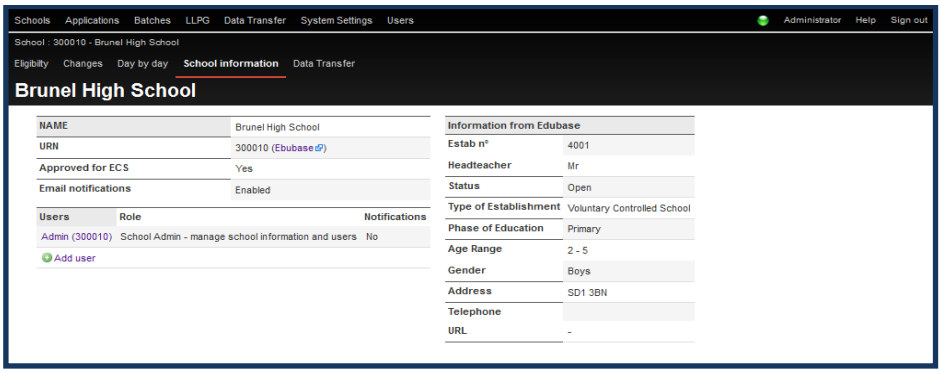


Figure 4: School information

LA Back-Office

The LA back-office enables the LA to see all of the applications for schools within its area using the search menu or for a single school if selected from the schools menu. Whilst encompassing all of the usual administrative functions such as user setup, audit frequency, email content etc. the main function of the back-office is to see the status of applications made. This is achieved under a series of sub-menus as shown in Figure 5.

Figure 5: LA back office menu

The school back-office is essentially a cut down version of the LA back-office with a restricted view of the school that the login allowed.

A fully functional demonstration version of both the application form and the back-office functions can be found at (SDA, 2013b).

CASE STUDY ONE: ACADEMY CONSORTIUM

Background

The Academy Consortium is a consortium of 18 academies (27 from September 2013) across England from Portsmouth to the Midlands. As an academy is independent of the LA and is directly funded by the government the group wanted the advantages of an online system that they could use as a consortia of schools that made up the group.

The how, when and where

As a result of information from an existing OFSM system user one of the finance directors arranged for the system to be demonstrated to the consortium managing group and a decision was made to pilot the system with one school and after the success of the pilot go for a full implementation across all the schools in the January 2013.

What

A Consortium branded online form was created with an appropriate URL and back-office systems. The system was rolled out to one school in December 2012 and following the success of this pilot to all the 19 schools in January 2013. From September 2013 a further 9 schools have joined the consortium and are using the OFSM system.

Result
The initial pilot school had already asked parental permissions to check eligibility on their behalf and where they had consented had given the appropriate details to the school. All of these applications were run through the system in the first couple of weeks. As a result 10 new eligible pupils were identified, resulting in provision of a school meal for these pupils and an extra income as a result of Pupil Premium of around £6,000.

Quotations

> The software is “Outstanding”. Contact Officer and school finance director
> “Everyone thinks it’s brilliant and has significantly reduced admin [sic]; the school has gained credibility as the introducer of the system”. Administrator

CASE STUDY TWO: A SINGLE ACADEMY SCHOOL

Background
This single academy primary school obtained academy status in 2012. Previously part of the LA, the school had been and still was part of the authority’s batch ECS service which schools could buy into. This would typically involve the school collecting eligibility status data from parent/caters (name, date of birth, NI number etc.) creating a data file and sending to the LA. The LA would then check this file against the ECS and append with the appropriate result.
However the school wanted a real-time system that parents could access themselves at any time and would give an instant decision to both parent and school, without having to use the LA as an intermediary.

The how, when and where
As a result of networking with a neighbouring LA the school was made aware of the SDA product that would enable the school and citizen to have a faster response and more control over the process. A demonstration of the system was organised on the school office computer in February 2013.

What
The solution consisted of a transactional web application form customised with the school logos and look-and-feel that was accessed via an appropriate URL/web address. The school’s own privacy notices and data protection advice together with any other information were also added.

Result
The system removed the need for parents to bring personal data into the school allowing them to make applications in the privacy of their own home (or office, internet café, library etc.) and gave them an instant response. This removes the stigma and the waiting associated with the old system. The school gets an immediate update of eligible pupils allowing them to organise the free meal as quickly as possible as well as accumulating data for Pupil Premium and other FSM based benefits.

Conclusion
Although only running the system for a month, through publicity in the school magazine the school have already had 2 new eligible applications which they put down to the ease of use of the system for parents.

Quotations

"really good…brilliant" Office Administrator
"Saves time and cuts down on paperwork and administration" Office manager

CASE STUDY THREE: A LARGE LA

Background
The LA is a large local authority with over 500 schools and over 17,000 children potentially eligible for free school meals.
The LA was already a regular user of the ECS for the batch processing of school meal applications from parents. Written forms from parents were delivered to the schools and passed on to the LA or delivered directly to the LA. Once the results of the application were known, the LA would pass on the data to the schools, usually on a spreadsheet.

The how, when and where
The LA wanted to enable parents to apply online, thus reducing the use of paper and keyboard entry at the LA. They wanted to get an immediate result and to notify both the school and the LA at the same time. In addition, they wanted to encourage the use of electronic communications between the parent, the LA and schools and to conduct automatic audits and renewal applications.
Setting up such a service in-house would have made demands on scarce internal resources, involving both staff and hardware, and any new development would have to compete for priority with other critical applications.

Result
SDA were able to offer an efficient and cost effective cloud-based solution to The LA. There were minimal start-up costs and a low annual rental charge. The LA was also given a reduced cost for being a regional lead authority.
The LA initially conducted a pilot with four schools to ascertain how the system would work in practice. SDA customised the online application form with the logos and look-and-feel of the LA web site and assisted the LA with their own Data Protection Act (DPA) and privacy notices which appear on the initial pre-application screens.
Following a pilot in March 2012, the LA decided to roll out the system to all schools in the LA. The LA supplied legacy OFSM data and contact details for each of its schools and SDA were able to populate the new system with these data. SDA also set up initial user IDs and passwords for each school user. Schools were given the URL link to access the application form and the back-office system.
Local Land and Property Gazetteer (LLPG) data were uploaded to enable postcode validation, mapping and address lookup facilities, with none of the ongoing costs usually associated with using commercially available addressing data. The list of participating LA schools is presented to applicants in school selection dropdown menus.

Conclusion
Because all schools and the LA are essentially using the same database, changes are immediate and visible to all those with rights to view them. Any amendments to how the system functions are done on the cloud by SDA so the LA is relieved of all the system maintenance responsibilities associated with client-based systems.
In all, the system requires minimal LA and school input and runs the OFSM process automatically as far as this is possible. In addition, it gives schools more control over their business and minimises the demands on scarce LA resources.

Quotations

"We think the service you offer is wonderful, it saves us so much time and worry, we get an answer immediately on whether or not the applicant is able to claim free school meals. Thank you, it's a must have service!" School Administrator

"I would just like to say that the service is excellent. It makes the whole procedure so much easier and straight forward. It has reduced our workload and we feel confident that everything is more secure and accurate." School Meals Administrator

"It is an extremely helpful service" Primary School Administrator

"It's also great that I don't have to go in and manually check the eligibility of the pupils, it's all done for me!" School Administrator

"The new free meal eligibility checking system has improved efficiency and communication between the LA and schools. School Administrators are very happy with the access to real-time information, and it has simplified our LA process, reducing time spent on checks whilst ensuring their accuracy. We now hope that the online route will encourage more parents of children eligible for free meals, to make sure their children have them." Catering Services Manager

CONCLUSIONS

The use of the system described has been an outstanding success. Initiating the online system is fairly easy including creating a URL for the establishment and a bespoke application form. Accreditation for web services can be turned around in a week as all the security and web service calls are identical for each system.

The system has the advantage of giving the LA up to date information about all applications, removing the need for annual reapplication and performing regular audit at weekly intervals ensuring that the benefit is always available to those who are eligible.

However, additional benefits are being recognised. For example, the removal of the stigma of application at the school can increase applications, helping to increase the number of applications from the estimated 200,000 parent/carers (Children's Food Trust 2013) who do not currently apply for the entitlement but who are considered to be eligible.

FURTHER WORK

As more LAs roll out the system there will be greater data to make comparative studies. This will form the basis of a more quantitative study in the future.

The addition of early year's entitlement for 2 year olds based on FSM eligibility further increases the usefulness of an eligibility checker and this is currently in development.

FSM eligibility is also used as a trigger for summer school for pupils between primary and secondary school. The effects on academic performance as a result of this will be interesting although, of course, these need to be tempered against the known advantages of receiving regular nutritious meals themselves.

REFERENCES

Children's Food Trust (2013). *Free school meals: why don't all parents sign up? Findings from a survey of parents in England.* Children's food trust: Sheffield.

Department for Education (2013) http://www.education.gov.uk/schools/pupilsupport/pastoralcare/a00202841/fsmcriteria / [Accessed 26 December 2013].

Granville S, Staniforth J and Clapton R (2006). *Investigating Local Authority procedures for identifying and registering children eligible for free school meal entitlement.* Scottish Executive. http://www.scotland.gov.uk/Resource/Doc/157044/0042264.pdf [Accessed 26 December 2013].

Storey P and Chamberlin R (2001). *Improving the take up of free school meals.* DfEE Research Report 270. http://dera.ioe.ac.uk/4657/1/RR270.pdf [Accessed 26 December 2013].

SDA (2013a). *Home page*. http://www.sda-ltd.com/ [Accessed 26 December 2013].

SDA (2013b). *OFSM home page.* https://www.cloudforedu.org.uk/ofsm/ [Accessed 26 December 2013].

Strickley, Alan (2013). *Data sharing between local and national governments for the benefit of the citizen: Online free school meals as a transformational project.* In Passey, D., Breiter, A. and Visscher, A. (Eds): ITEM 2012, IFIP AICT, 400, pp. 107-118, 2013 Springer: London