Online Free School Meals as a Cloud-Based Solution: Three Case Studies of Its Use in England

Alan Strickley

HAL Id: hal-01342716

https://inria.hal.science/hal-01342716

Submitted on 6 Jul 2016

Online Free School Meals as a Cloud-Based Solution: Three Case Studies of its Use in England

Alan Strickley

Cria Technologies, United Kingdom
alan.strickley@criatech.co.uk

Abstract. Online Free School Meals (OFSM) was a transformational programme supported by the Department for Education (DfE) in England. The full process is documented by Strickley[1]. Whilst the use of the system can be judged an overwhelming success, most Local Authorities (LAs) have stopped short of the full web-based system in which parents can apply directly via an online form as a result of the perception of negligible cost benefits created by a lack of technical expertise, scarce resources and server and development costs. The paper describes how these issues were overcome by developing a generic cloud-based solution. The paper looks 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 adoption, implementation, usage and benefits. It concludes that a cloud-based system is cost effective by removing much administration and as a result of lowering the stigma of applying can result in an increase in applications. This has resulted in financial advantages for schools and LAs.

Keywords: Free school meals, stigma, eligibility checking service, cloud, online.

1 Background

The provision of free school meals (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 concerned children whose parents were in receipt of certain support payments [2].

The online free school meals (OFSM) programme was supported by the Department for Education (DfE) and implemented by Connect Digitally in England and Wales in 2010. The full process, documented in Strickley [1], consisted 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 entitlement of FSM for their children.

The process is performed using a system called the Eligibility Checking System (ECS) which matches the three criteria against data held in three central government databases, namely, the Home Office, the Department of Work and Pensions (DWP)

and Her Majesty's Revenue and Customs (HMRC). A decision is normally received in seconds.

The new online system removes the paper evidence required to prove eligibility [3] thereby creating efficiencies in terms of time and cost for a local authority (LA), removing the stigma for a parent/carer's application [1,4 ,5] as well as giving quick turnaround of a decision, an audit of continuing eligibility and a free school meal for the child within days of an application. As [1] 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 comma-separated value (CSV) file; often generated and stored in a spreadsheet.

At the time of the Strickley paper (2013) 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-based service 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) [6], 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 using the same web service calls for every form instance, 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.

2 Implementation

As explained in the "Background" section, 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 [7]. 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 such that an "average cost" would be in the region of £5,000 per LA and £500 for a single school as against £15,000 to £20,000 for a bespoke solution [8].

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 [9].
- A URL was assigned for the application form and back-office functions.
- A list of schools and user details were supplied by the LA.
- Any existing FSM data were supplied in a format defined by SDA for import into the new system.
- Local Land and Property Gazetteer (LLPG) data were 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 an 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 below. 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 this next section on "Security" deals specifically with this area.

3 Security

Any system needs to be secure but one that utilises cloud technology has to be more so [10]. The company, SDA, was 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 [11] 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.

4   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.

4.1   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 NINO 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.

4.2 School back-office

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.

Fig. 1: Eligibility screen

The screen in Figure 1 shows the list of currently eligible children in a school obtained from selecting the menu item Eligibility. The list may be re-ordered by clicking on the appropriate column heading, printed as a screen dump or downloaded

as a portable document format (PDF). Additional menu items along the top have the functionality as below:

- 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).

In addition, clicking on the reference (column 5 in Figure 1) brings up a screen containing the complete application data set as shown in Figure 2.

Fig. 2: Application details

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 3 shows the search menu item through which applications may be searched, based on a single criterion or multiple criteria. In addition, this screen may be used to obtain a CSV file output of the results of the search.
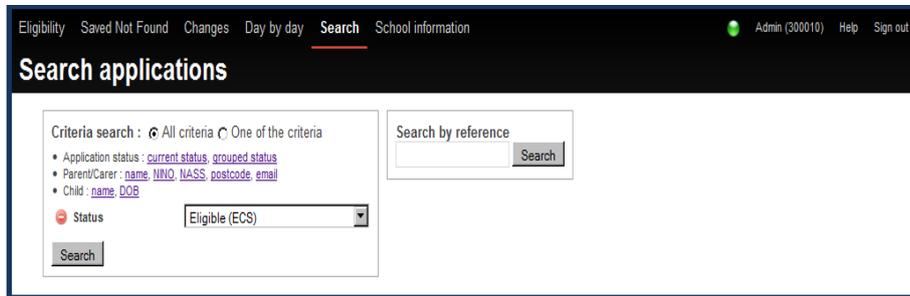
Fig. 3: Search screen

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.
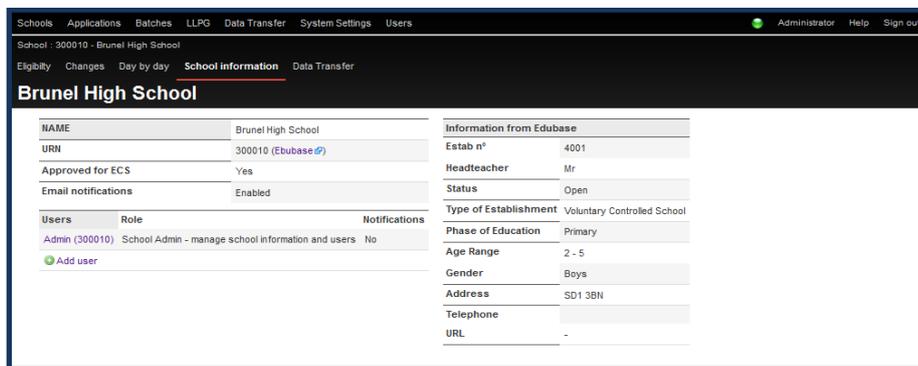
Fig. 4: School information

4.3 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 school's 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.
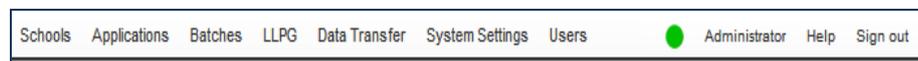
Fig. 5: LA back-office menu

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

316

demonstration version of both the application form and the back-office functions can be found at [7].

5   Research Approach

The purpose of this research was to investigate how effective the introduction of a conceived user-friendly, cost-effective, cloud-based solution for OFSM would be in a variety of school settings. 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, to give the study early results 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. These were carried out by one of the developers not known personally to the interviewee. In addition, emails received as a result of the process, support calls and statistics before and after implementation were also used.

The interviews asked questions about the system including the user's reasons for choosing the solution, how they previously checked eligibility, advantages and disadvantages of the system, how they rated the system, possible improvements and any additional comments.

Interviews were conducted via telephone following an email request with a preview of the questions above and the option to respond via email; however, none of them chose this option.

These interviews were intended to obtain an evaluation of the system and were open ended to give the users ample opportunities to express their opinions without too much structure or question bias.

6   Case Study One: An Academy Consortium

6.1   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 consortium of schools that made up the group.

6.2 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 January 2013.

6.3 What

A Consortium-branded online form was created with an appropriate universal resource locator (UR)L 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 joined the Consortium and are using the OFSM system.

6.4 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 (an extra amount of pupil-focused funding for children who are eligible for FSM) of around £6,000.

Interviews were carried out with the contact officer, who initiated the system across the academy group and supported the users on a day-to-day basis and considered the software to be "Outstanding". However they did consider that transfer of the data to their school management information system (MIS) would be an improvement.

An interview with a school administrator resulted in the following comment:

"Everyone thinks it's brilliant and has significantly reduced admin [sic]".

7 Case Study Two: A Single Academy School

7.1 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 LA's batch ECS service which schools could buy into. This would typically involve the school collecting eligibility status data from parents/carers (name, date of birth, NINO, 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.

7.2   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.

7.3   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.

7.4   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.

7.5   Conclusion

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

An interview with the office manager resulted in the following statement:

"Saves time and cuts down on paperwork and administration".

This was mainly as a result of the self-documenting features of the software and the removal of the need for office staff to examine and make decisions based on the paper evidence supplied.

This was echoed by the office administrator who thought the software was:
"really good… brilliant".

In addition they were impressed by the speed of the online decision (usually seconds) and thought its extension to the area of uniform grants would be helpful.

8   Case Study Three: A L LA

8.1   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.

8.2   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.

8.3   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 statement 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 identification data (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.

8.4 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.

Despite being the largest user in this research the comments were the most positive of the three. This can be summed up by the quotation below from the catering services manager:

> *"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."*

It seems that the simplification of the process and the reduction in time needed to administer it in a larger environment is greater for a larger number of users and particularly in a public service environment. Further studies in other comparable LAs will enable more evidence regarding this.

9 Conclusions

The use of the system described appears to have been an outstanding success based on the evidence collected. 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 [1] who do not currently apply for the entitlement but who are considered to be eligible.

10 Further work

As more LAs roll out the system there will be greater data to make comparative studies of the system's usage, effectiveness in terms of increasing eligibility application and overall user satisfaction. 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 scope of an eligibility checker and this is currently in development.

FSM eligibility is also used as a trigger for summer schools (additional tuition for pupils when they move between primary and secondary schools). The effects on academic performance as a result of this extra teaching and learning will be interesting, although, of course, these need to be tempered against the reported advantages [11] of receiving regular nutritious meals themselves.

The system can be used within England and Wales as they have the same criteria for FSM; however, it is considered that given the cooperation from the appropriate government that the principles could be extended to the rest of the UK or beyond through the use of a similar middleware solution connecting central databases to a public portal in a secure way.

References

1. Strickley, A.: 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., Visscher, A. (eds) ITEM 2012, IFIP AICT,107-118, Springer, London (2012)
2. Children's Food Trust: Free school meals: why don't all parents sign up? Findings from a survey of parents in England. Children's Food Trust, Sheffield (2013)
3. Department for Education: Eligibility Criteria. [Retrieved August 29, 2014, from http://www.education.gov.uk/schools/pupilsupport/pastoralcare/a00202841/fsmcriteria/] (2013)
4. Storey, P., Chamberlin, R: Improving the take up of free school meals. DfEE Research Report 270. [Retrieved August 29, 2014, from http://dera.ioe.ac.uk/4657/1/RR270.pdf] (2001)
5. Granville, S., Staniforth, J., Clapton, R.: Investigating Local Authority procedures for identifying and registering children eligible for free school meal entitlement. Scottish Executive. [Retrieved August 29, 2014, from http://www.scotland.gov.uk/Resource/Doc/157044/0042264.pdf] (2006)
6. SDA: Home page. [Retrieved August 29, 2014, from http://www.sda-ltd.com/] (2013)
7. SDA: OFSM home page. [Retrieved August 29, 2014, from https://www.cloudforedu.org.uk/ofsm/] (2013)
8. Connect Digitally: Frequently asked questions for web services. Department for Education, Sheffield (2013)
9. DfE: FSM system integration guide. Department for Education, Sheffield (2010)
10. Wyld, D. C.: Moving to the cloud: An introduction to cloud computing in government. IBM Centre for the Business of Government, Hammond, LA (2009)

11. Telecity: Home page. [Retrieved August 29, 2014, from http://www.telecitygroup.com/] (2013)
12. DfE: Evaluation of the free school meals pilot: Impact Report, National Centre for Social Research, London (2013)