Digital Competency Assessment System

March 2023

Scottish Government
Riaghaltas na h-Alba

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1. Introduction

1.1 Purpose of this document

1. The purpose of this report is to present a review and assessment of options for the delivery and ongoing maintenance of a Digital Competency Assessment System (CAS) for building standards verifiers.

1.2 Project Purpose

1. Storm ID was commissioned by Building Standards Division to undertake an options appraisal between 09 January 2023 to 16 March 2023 for a digital Competency Assessment System (CAS) for verifiers. The aim of this project is to evaluate options in order to develop a Digital CAS that will meet user and business needs and give a recommendation on the best option for the Digital CAS.

2. Our objectives are:

    - Gain a deeper understanding of user needs in order to identify features that should be in the Digital CAS
    - Consider assessment criteria for technical options
    - Evaluate technical options using assessment criteria to inform a final recommendation

1.3 Background

Building Standards System

1. The Building (Scotland) Act 2003 established the building standards system in Scotland. The 32 Local Authorities (LAs) in Scotland are appointed by Scottish Ministers as verifiers to administer the building standards system in their geographical areas. Their appointment is conditional on local authority verifiers meeting the requirements of the Operating Framework and Performance Framework.

2. The verifier's primary function is to protect public interest by providing an independent check of building warrant applications at both the design and construction stages. A building warrant must be obtained before any work commences on site. Furthermore, a completion certificate must be granted by a verifier if they are satisfied the building work has been carried out in accordance with the building warrant and building regulations.

Performance Framework

3. Verifiers are expected to operate under the Building Standards Verification Performance Framework which covers the following three perspectives:

    - Professional Expertise and Technical Processes
    - Quality Customer Experience
    - Operational and Financial Efficiency

4. The perspectives are supplemented by three themes: Public Interest; Continuous Improvement; and Partnership Working.

Workforce Strategy

5. The workforce strategy for the building standards verification service was published on 01 October 2020 and is being implemented over a three-year period. The aim of the strategy is to increase operational resilience of the building standards service. It sets out national and local commitments and actions to strengthen the skills and competence of the workforce, and attract, recruit and retain people in essential job roles.

6. The strategy has four themes related to national and local commitments:

    - A sustainable workforce
    - A skilled workforce
    - A professional framework
    - A profession for everyone

7. There are five delivery projects to support a coherent approach to delivery with partners:

    - Implement the Competency Assessment System
    - Promoting the Building Standards Profession
    - Implementing a Professional Competency Framework
    - Developing Vocational Pathways
    - Developing a Learning and Development Hub

8. The Workforce Data Collection Analysis Report 2021 found demand for building standards verifier job roles is increasing slightly, however there has been no significant change to the size of the workforce. Therefore, the increasing levels of demand are currently not being met. Over the next three years, the workforce is expected to have a shortfall of resourcing levels. Effective recruitment and succession planning are necessary to grow the workforce.

9. New people need to be brought into the building standards profession and career progression opportunities need to be highlighted to existing staff. The Professional Competency Framework (PCF) for verifiers and the Competency Assessment System (CAS) are key parts of the workplace strategy to resolve the issues identified in the report.

Professional Competency Framework (PCF) and Competency Assessment System (CAS)

10. The PCF and CAS were launched on 12 May 2021. Verifiers use the CAS to assess their building standards competencies and identify skill gaps that can be improved through education and training. The current version of the CAS comprises a large referencing PDF handbook setting out the competency requirements across different job levels, and an accompanying spreadsheet toolkit to help assess and record skill gaps for the job holder and their manager. The CAS requires the verifier and their manager to work together to determine the verifier's competency levels and identify any skill gaps. A feedback exercise of this first version of the CAS ran from June to mid-December 2022.

11. The main findings of CAS Feedback Exercise Report (December 2022) were:

    - Considerable time is required to complete the process; it is extremely difficult to balance day to day work as well as complete the CAS

    - There is a strong preference for the CAS and toolkit to be an interactive, dynamically populated, online system to reduce the time needed for completion

    - A useful feature would be to include links to relevant training opportunities

    - The PCF document was considered fit for purpose

12. In order to address some of the issues raised in the report, Storm ID carried out research into options for a Digital CAS that would simplify and speed up the overall process.

2. Research

2.1 Research Methods

1. We interviewed Building Standards Managers and Team Leaders from various local authority verifiers. We investigated how each local authority conducted the CAS, what they liked and disliked about the CAS process (including the handbook and toolkit), and what technical features would they like to see in a Digital CAS.
2. We spoke to a Local Authority Building Standards Scotland (LABSS) consultant and Building Standards Hub Director to understand their needs and how learning and development can be integrated into a Digital CAS.

3. In order to get a deeper understanding of some of the technical requirements, we spoke to the following Scottish Government representatives:
   - Building Standards Digital Transformation Lead
   - Digital Planning Solution Architect
   - Head of Identity Services

4. Additionally, we also spoke to the Head of Digital Public Services (Improvement Service) and a consultant for the Building Standards Virtual Learning Environment (VLE) vendor, Learning Pool.

2.2 Research Outcomes

What did Building Standards Managers like about CAS?

1. There is support and understanding of why the CAS process is needed. Building Standards Managers reported the CAS produces a comprehensive review of the skills gap in the building standards profession. In particular, they liked the consistent approach to assessing verifiers' competencies on an individual level, as well as across the wider Building Standards team. It has been noted the CAS benefits individuals with less experience more than individuals further in their career. It is especially beneficial for those wanting to develop their skills for job progression.

What did Building Standards Managers dislike about CAS?

2. Whilst Building Standards Managers understood the importance of having the CAS process, there are areas they do not like. All Managers reported the entire process takes too long, especially evidence collection by the job holder to prove their competency level. Building Standards Managers highlighted that many members of staff were put off completing the CAS as they found it intimidating, daunting and demotivational.

3. Furthermore, staff had issues with the spreadsheet toolkit. They found the spreadsheet difficult to use, navigate and populate and found cross referencing between the handbook and toolkit to be time-consuming. Individuals with a lack of Excel knowledge or confidence particularly struggled with the spreadsheet aspect of the CAS process. Depending on the job role, the types of projects verifiers are working on, and the location of the local authority (e.g. urban vs rural), certain parts of the CAS are deemed as irrelevant.

4. A potential solution to address this is the option to bypass whole sections. This would reduce the time needed to complete the CAS, however a governance process would need to be implemented. Governance rules would need to be established to ensure that only specific people can bypass sections of the CAS in specific circumstances. For example, if a verifier attempts to skip a section, it will need manager approval to ensure only the right people can skip sections for the right reasons.

Areas of improvement for CAS

5. Building Standards Managers identified other areas of improvement for the CAS. These include reviewing the CAS implementation process (as there is significant variation between LAs), simplifying and shortening processes, reviewing the contents of the handbook and toolkit to reduce duplication, and considering other ways to assess competencies of more experienced members of staff. However, it is worth noting the comprehensive nature of the CAS is necessary in order to thoroughly assess the verifier's competency skills, and all verifiers need to be assessed routinely to ensure any skills are maintained.

6. Whilst the CAS can identify skills gaps, it does not support the user in recording next steps of how to improve on identified skill gaps. Future improvements to solve this problem could be to provide direct links to training materials and training opportunities. This would reduce time for both the job holder and the Building Standards Manager as there would be no need to spend time to develop an appropriate learning plan and manually finding training materials. The CAS would be improved further by recording which training courses have been completed, suggest similar training modules, and provide links to external training providers.

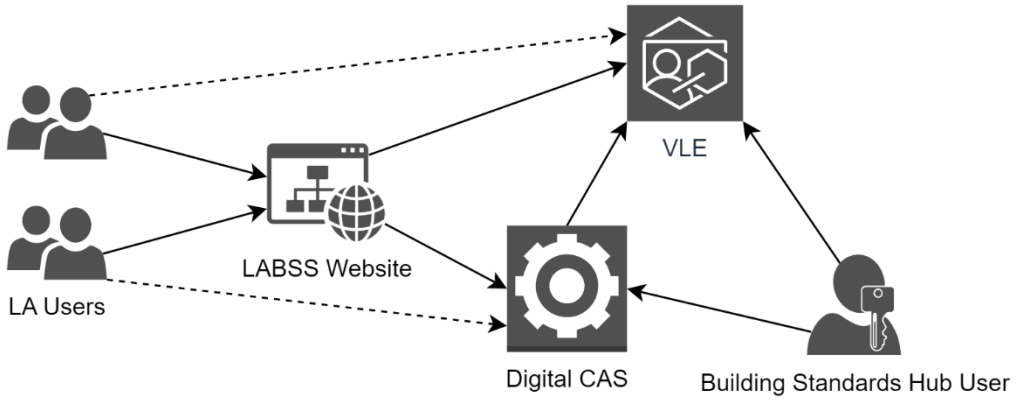
7. Building Standards Managers would benefit from the ability to generate reports on an individual level and for their team to get a detailed understanding of skill gaps and prioritise training. Building Standards Hub would benefit from the ability to generate reports on a national level across Scotland to get a widespread understanding of skill gaps. Building Standards Hub would be able to use this reporting function to make decisions on the prioritisation of training modules on the VLE.

3. Technical Requirements

3.1 Context

1. Throughout engagements with stakeholders, it was apparent that the expected approach for a Digital CAS would be a centrally hosted digital system available over the internet via a web browser. It is expected that users will access the Digital CAS via the LABSS website. From the Digital CAS, users are expected to be able to directly access learning objects within the current Virtual Learning Environment (VLE), which will provide virtual learning opportunities to local authority building standards staff. Building Standards Hub users would have administrator access to the Digital CAS in order to perform maintenance tasks, for example when CAS competencies need to be updated to align with updates to legislation.

   Figure 3.1 - High Level System Diagram



2. Although they will maintain the same look and feel, and they may exchange information, the LABSS Website, Digital CAS and VLE are expected to be separately built and hosted components which do not depend on each other to function correctly. This means that, while the diagram above outlines the expected user journey, there is no single point of failure. For example, if the LABSS website were unavailable, users could still navigate directly to the Digital CAS and VLE if they knew the URL.

3. The current VLE vendor, Learning Pool, have confirmed that the VLE can support deep linking to individual learning objects. This means that the Digital CAS can provide direct links from competency items to learning objects, whether they are managed within the VLE or by external training providers.

3.2 Local Authority Requirements

1. Engagement showed that, on the basis that the Digital CAS would be a web application which required no action from local authority IT departments, there were not considerable constraints applied from a Local Authority level:

    - All web traffic should be encrypted in transit, and use standard ports (e.g. 443)

    - Compatibility should be maintained with common web browsers, without reliance on having the latest versions

    - URLs for the Digital CAS (and any third party URLs referenced by it) should be provided to local authorities for whitelisting

    - There is a preference for modern authentication methods, e.g. multi-factor authentication (MFA) and single sign-on (SSO) where possible

    - A Data Protection Impact Assessment (DPIA) should be carried out, with personal data capture kept to a minimum, and data security and data retention to meet UK GDPR regulations.

3.3 Scottish Government Requirements

1. Engagements with Scottish Government (SG) representatives were more focused around non-functional requirements:

    - Any custom development to be hosted by SG should be hosted on the Cloud First platform

    - If the solution is to be hosted by a third party, a full security assessment must be carried out

    - Any custom development should be done in alignment with the Digital Service Scotland Standard (DSSS)

    - Multi-Factor Authentication (MFA) is preferred for user authentication. The Identity Provider (IdP) which would be used if the platform is hosted by SG is OKTA

    - Where appropriate, existing platforms and solutions already in place within SG should be re-used.

3.4 VLE Requirements

1. Following engagement with the incumbent provider of the Virtual Learning Environment (VLE), it was identified that integration with the VLE would be best accomplished using the following features:

    - Single Sign-on (SSO) is supported using the SAML 2.0 protocol

    - Deep-linking to specific learning items is possible, to enable linking from specific competencies in the Digital CAS

2. As such, it would be advantageous for the Digital CAS to take advantage of these features.

3. In addition, the VLE can support the provision of course completion (per user) via CSV file export on a nightly basis but receiving these into the Digital CAS is not seen as a key constraint at this stage.

4. Assessment Criteria

4.1 Primary Criteria

1. The primary criteria are those that will have the greatest impact on the success of the project or would have significant detrimental impact on project stakeholders if they were not met.

    - **Alignment with draft user requirements specified in *Appendix 10.1*** – The chosen solution should align well with the draft user requirements identified during engagements with stakeholders

    - **Cost** – The chosen solution should represent good value for money

    - **Security** – The chosen solution should meet all security standards required by stakeholders.

4.2 Secondary Criteria

1. The secondary criteria are those criteria that are less likely to cause overall failure of the project if they are not met but are still important in order to achieve the best outcome.

    - **Timescales** – The chosen solution should be possible to implement within a reasonable timescale

    - **Extensibility** – The chosen solution should be extensible in the following ways:

        - It should be possible to edit existing competencies

        - It should be possible to add new competencies and groups of competencies

        - The solution should provide the flexibility to extend functionality to meet future requirements

    - **Ease of maintenance –** The chosen solution should be easy to maintain by administrators

    - **Interoperability** – The chosen solution should be able to integrate with other systems, including:

        - LABSS Virtual Learning Environment

        - Local Authority Learning and Development Systems

- **Reuse of Services** – The chosen solution should reuse existing services and resources that are available to Building Standards Division, LABSS and/or the Building Standards Hub

4.3 Market Assessment

1. A full market assessment was done on available platforms and technologies that could be used to provide a Digital CAS solution. We identified five suitable options and further assessed the advantages and disadvantages of each one. The five options are:

    - Amend existing CAS
    - Leverage VLE functionality
    - Bespoke .Net solution
    - Low-code Power Platform
    - Purchase an existing Software-as-a-Service (SaaS) product

5. Options Appraisal

5.1 Option 1: Adapt existing CAS content

1. User feedback on the existing CAS from local authority building standards surveyors shows that it is too large and intimidating. Some adjustments to the content of the existing CAS framework spreadsheet could be realised quickly and cheaply which would improve user experience. While these would not resolve the identified issues, they might be worth putting into practice in the short term as an interim solution to help end users.

2. The following are some examples of improvements that could be made:

    - Moving specific pieces of guidance held in the CAS handbook into the relevant competency items within the CAS framework spreadsheet

    - Filtering the competency items within the CAS framework spreadsheet to only those that are relevant to the user filling it out

    - Reviewing the CAS framework to merge duplicate and remove unnecessary content

Cost

3. We would expect this option to attract the following costs:

    - License and maintenance: **Free**

    - Implementation**:** Potential small amount of consultancy from a specialist

Implementation Considerations

4. We would expect this option to take a **maximum of 1-2 months** to implement.

5. Adaptation of the existing CAS content could be implemented by the existing Building Standards Hub / LABSS stakeholders with the assistance of a specialist with experience in improving the useability of the existing Excel spreadsheet.

Strengths

6. This option has the following strengths:

    - Low cost and effort
    - Easy to implement quickly
    - Minimal training or changes to the current process required since users are already used it
    - Can easily adapt the toolkit to remove and/or add competency items

Weaknesses

7. This option has the following weaknesses:

    - Does not address all user requirements
    - Still quite a cumbersome and time-consuming process
    - Does not address all of the issues that have been reported with the CAS
    - Use of PDF is not accessible
    - Substantial changes would need to be made in order for users to feel the impact
    - Users with low Excel confidence/knowledge will continue to struggle using the toolkit without proper Excel training

5.2 Option 2: Leverage existing Virtual Learning Environment functionality

1. The existing Virtual Learning Environment includes a competency management system module. This module would allow for the creation of a competency framework which could be populated with the circa 700 competency items included within the CAS. The module does not allow for full customisation, so it would not be possible to capture all of the data points that are currently captured within the CAS for each competency item.

2. However, it would be possible to capture the most important information, i.e.:

    - Description of the competency item
    - Links to relevant training items
    - The employee's compliance level (achieved/not achieved/not applicable) with the competency item

3. Further investigation would be needed to prove the feasibility of this option.

Cost

4. We would expect this option to attract the following costs:

    - License and maintenance: **Potentially already included within existing VLE costs, subject to confirmation with existing vendor**
    - If using an external identity provider, this would attract an additional indicative cost of **£20-100 per month**
    - Implementation: **Potential small amount of consultancy fees** if needed, to be confirmed by Building Standards Hub in discussion with existing vendor

Implementation Considerations

5. Estimation of timescales for this option would require further investigation with the current VLE provider, Learning Pool

6. This option is likely to be outside of the scope of the existing contract with Learning Pool and may therefore require amendments or a separate contract.

Strengths

7. This option has the following strengths:

    - Low cost and effort
    - Easy to implement quickly

- Single platform for both virtual learning and competency management

Weaknesses

8. This option has the following weaknesses:

    - Does not allow for capture of all of the CAS data points
    - Potential vendor lock-in
    - No scope for custom or conditional workflows, for example allowing for questions or sections to be skipped
    - A change in the CAS process is needed to use this option, which may add implementation time to establish the competency assessment process

5.3 Option 3: Bespoke .Net development

1. A bespoke development would allow complete control over a customised solution which is tailored directly to the requirements of the Digital CAS therefore providing the best end result. This option gives the greatest flexibility and best functionality, and therefore will also require the most up-front effort and cost of the options considered, due to the additional development effort required.

2. Microsoft's .Net platform is recommended as the platform of choice due to the following reasons:

    - .Net is free and open source
    - It has a wide variety of use cases within public sector organisations
    - There is good support and integration with the Azure cloud platform, which is available as a hosting option via Scottish Government's Cloud First team
    - It is aligned to the tech stack in use in other Scottish Government developments
    - It has a significant market share and support community, meaning that there are many providers available for support, maintenance and implementation of any future updates

3. While the proposed functionality of the Digital CAS does not appear to be particularly technically challenging, the volume of competency items may raise some challenges in terms of design. Any custom development option should therefore include a suitable amount of design time to work out the best way to display and capture the data.

4. Data held within a .Net solution would be made available in a standardised format which facilitates reporting within tools that SG may have already, such as Power BI.

5. A potential bespoke developed platform would comprise the following components:

    - Web Application User Interface
        - Provides a user friendly experience for local authority users to manage their own competencies and those of their direct reports
        - Provides a user friendly experience for Building Standards Hub administrators to administer competencies in line with changing legislation

    - Allows for single sign-on between the Digital CAS, the VLE and the LABSS website
    - Provides reporting and data export for managers and administrators
- Application Service
    - Includes back-end logic relating to user processes and competency management
- Data Store
    - Stores all user and competency data in a standardised format so that it can be used as a data source for common reporting

Cost

6. For a bespoke .Net development of a Digital CAS platform we would expect the following costs to be incurred:
    - Indicative Recurring fees: **£500 per month** for Azure hosting
    - Indicative Implementation Cost**: £150k** for bespoke development, including additional overheads outlined in **Implementation Considerations** below
    - If using an external identity provider this would attract an additional indicative cost of **£20-100 per month**
7. Implementation costs and associated timescales can be roughly broken down into:
    - 30% for Alpha
    - 50% for Beta
    - 20% for Live
8. The above costs could increase if:
    - Full DSSS panel assessment is required. This can increase the effort by up to 30%
    - Additional project phases are required
    - Additional rounds of user testing or performance testing are required.

Implementation Considerations

9. We would expect a bespoke .Net implementation of a Digital CAS platform to take **about 6-9 months** to implement, assuming the implementation team are allocated 100%. This includes all activities needed to get to a live product including development (frontend, backend and cloud infrastructure), testing, design, content design, user research, analytics, deployment, consultancy and project management.

10. For implementation of a bespoke .Net development, we would expect a multi-disciplinary implementation team to consist of:

    - Front end, back end and cloud infrastructure developers
    - Tester
    - Designer
    - Content Designer
    - Analytics Consultant
    - User Researcher
    - Project Manager
    - Digital Consultant
    - Technical Consultant

Strengths

11. This option has the following strengths:

    - Tailored exactly to requirements
    - Provides the flexibility to produce a solution that strongly aligns with user needs
    - Developed in line with SG development and security standards
    - Options for hosting including the SG Cloud First platform
    - Data is held in-house so vendor lock-in is avoided
    - Lower recurring costs

Weaknesses

12. This option has the following weaknesses:

    - Most effort and therefore a higher implementation cost
    - Potentially longer time to develop

5.4 Option 4: Low-code development

1. Low-code platforms allow for rapid development of custom solutions. They do not provide quite the same level of customisation as a bespoke development, but they do allow for a good level of customisation which would support the requirements of the Digital CAS. Low-code development is generally quicker than traditional development due to foundational components already being in place and the use of templates.

2. A number of low-code platform options are available which could be used to build a Digital CAS system, including:

    - Specific low-code development platforms, such as Microsoft Power Platform or OutSystems
    - CRM systems such as Microsoft Dynamics or Salesforce
    - Open source form builders

3. Of the low-code platforms reviewed, the Microsoft Power Platform is recommended as the platform of choice:

    - Applications built with Power Platform are often familiar to users who already use Office 365 products

    - There is a good market share and support network available

    - There are a wide variety of use cases already in place throughout the public and private sectors

    - Power Platform is scalable by default based on demand and therefore would not need any intervention should load increase

    - Development and reasonable operational use are included in a Microsoft 365 Enterprise license, which SG could potentially use to reduce costs

4. As with the custom .Net option, while the proposed functionality of the Digital CAS does not appear to be particularly technically challenging, the volume of competency items may raise some challenges in terms of design. Any custom development option should therefore include a suitable amount of design time to work out the best way to display and capture the data.

5. Similar to a bespoke .Net application, a Power Platform implementation of the Digital CAS would be tailored directly to user needs. There will be some areas where there may be less flexibility than a .Net application, such as how screens can be structured and how data can be stored, but these limitations are minor.

6. Data held within a Power Platform solution would be available for reporting via Power BI and other reporting tools.

Cost

7. For a Power Platform implementation of a Digital CAS platform we would expect the following costs:

    - Indicative recurring costs: **£500-1000 per month** (depending on how often users log in). These costs relate to the cost per user for Power Pages authenticated users, which attract a cost of £150 per 100 users who log in per month. This is a centrally managed cost which is liable to be paid by the organisation which hosts the application.

    - Indicative implementation costs: **£100k** for Power Platform development, including additional overheads outlined in **Implementation Considerations** below

    - If using an external identity provider this would attract an additional indicative cost of **£20-100 per month**

8. Implementation costs and associated timescales can be roughly broken down to:

    - 30% for Alpha
    - 50% for Beta
    - 20% for Live

9. The above costs could increase if:

    - Full DSSS panel assessment is required. This can increase the effort by up to 30%
    - Additional project phases are required
    - Additional rounds of user testing or performance testing are required.

Implementation Considerations

10. We would expect a Power Platform implementation of a Digital CAS platform to take **about 4-6 months** to implement, assuming the implementation team are allocated 100%. This includes all activities needed to get to a live product including Power Platform development, testing, design, content design, user research, analytics, deployment, consultancy and project management.

11. For implementation of a Power Platform Digital CAS solution, we would expect a multi-disciplinary implementation team to consist of:

    - Power Platform Developers
    - Tester
    - Designer
    - Content Designer
    - Analytics Consultant

- User Researcher
- Project Manager
- Digital Consultant
- Technical Consultant

Strengths

12. This option has the following strengths:

    - Rapid development
    - Lower development time and therefore cost than bespoke .Net
    - Good degree of flexibility (with limitations)
    - Tailored exactly to requirements (with limitations)
    - Developed in line with SG development and security standards
    - Data is held in-house so vendor lock-in is avoided

Weaknesses

13. This option has the following weaknesses:

    - Monthly per-user cost for building standards users would increase costs as more people enter the profession as set out by the workforce strategy
    - Not as customisable/flexible as bespoke .Net development

5.5 Option 5: Purchase existing Software-as-a-Service (SaaS)

1. A review was carried out on available SaaS products which include capabilities for competency management. Several Learning Management System (LMS) platforms include such functionality, however we found no competency management products which could be procured on their own.

2. If there were an appetite to replace the incumbent VLE with another supplier, then a SaaS provider who provides a robust competency management system could be considered, but this is unlikely the most cost-effective solution as the VLE implementation is already underway with the current supplier.

Cost

3. License and maintenance**:**

    - SaaS options are generally licenced on a per user basis

    - Costs vary by supplier, but one example gave a cost of £2.50 per user licence per month, which would give an approximate cost of **£1500 per month** if all 600 local authority verifier users were provided with a licence.

    - If using an external identity provider this would attract an additional indicative cost of **£20-100 per month**

4. Implementation**:**

    - Implementation costs would consist of professional services from the chosen supplier to assist with the configuration of the SaaS product to suit the DCAS and VLE requirements

    - It has not been possible to provide an estimate of this cost at this stage.

Implementation Considerations

5. Timescales for this option would vary dependent on the supplier chosen. It is expected that an implementation team would be provided by the chosen SaaS vendor.

Strengths

6. This option has the following strengths:

    - Low time-to-implement

    - Low capital expenditure

Weaknesses

7. This option has the following weaknesses:

    - Not as flexible as custom options
    - May not meet all user requirements
    - Won't be interoperable with existing VLE
    - Can only be procured as part of a larger LMS system, so not likely to be cost-efficient
    - In general, SaaS licensing costs are recognised as being high per month, per user, therefore costs would increase as more people enter the profession as set out by the workforce strategy

5.6 Cost Comparison

1. The below table presents the approximate costs and timescales of each option for comparison.

Table 5.6 – Cost Comparison

	Option 1 (Amend existing)	Option 2 (VLE)	Option 3 (Bespoke .Net)	Option 4 (Low-code)	Option 5 (SaaS)
Recurring cost	Free	Included	£500 per month	£1000 per month	£1500 per month
Identity Provision	N/A	£20-100 per month	£20-100 per month	£20-100 per month	£20-100 per month
One-off cost	Small consultancy fee	Small consultancy fee	£150k	£100k	(varies)
Time to implement	1-2 months	TBC	6-9 months	4-6 months	(varies)

5.7 Scoring

1. The below table presents each of the above five approaches and how they compare against the defined assessment criteria. Scoring is relative between the approaches. The minimum score for each criterion is 1 and the maximum score is 5. All options are scored out of 40.

Table 5.7 – Scoring of Options based on Assessment Criteria

	Criteria	Option 1 (Amend existing)	Option 2 (VLE)	Option 3 (Bespoke .Net)	Option 4 (Low-code)	Option 5 (SaaS)
Primary	Alignment with Requirements	1	2	**5**	**4**	3
	Costs	**5**	**5**	3	3	2
	Security	2	3	**5**	**5**	3
Secondary	Timescales	**5**	**4**	2	3	**4**
	Extensibility	1	2	**5**	**4**	2
	Ease of Maintenance	2	3	**4**	**4**	**4**
	Interoperability	1	2	**5**	**4**	2
	Reuse of Services	**4**	**4**	3	3	1
	Total	**21**	**25**	**32**	**30**	**21**

5.8 Hosting Considerations

1. Options 3 (Custom Development) and 4 (Low-code development) must be hosted within a cloud platform. It would be recommended to choose the same provider for Identity Provision and Hosting. Approximate hosting costs are included earlier in this report.

2. The following components would require to be hosted:

    - Application front end
    - Database back end
    - Identity Provider

3. The chosen cloud platform and development platform will determine which exact components are hosted and how they are provisioned. The following hosting options are available:

    - **Scottish Government**
        - The Scottish Government Cloud First platform offers hosting on AWS and Azure platforms.
    - **Improvement Service**
        - The Improvement Service offer hosting on the AWS cloud platform and have a track record of providing digital services to all 32 local authorities in Scotland, though not specifically within the same remit as the Digital CAS.
    - **Third Party**
        - An independently procured cloud solutions hosting provider could be chosen to host the Digital CAS. This would provide the most flexibility, but would be subject to additional security assessments.

5.9 Identity Provision

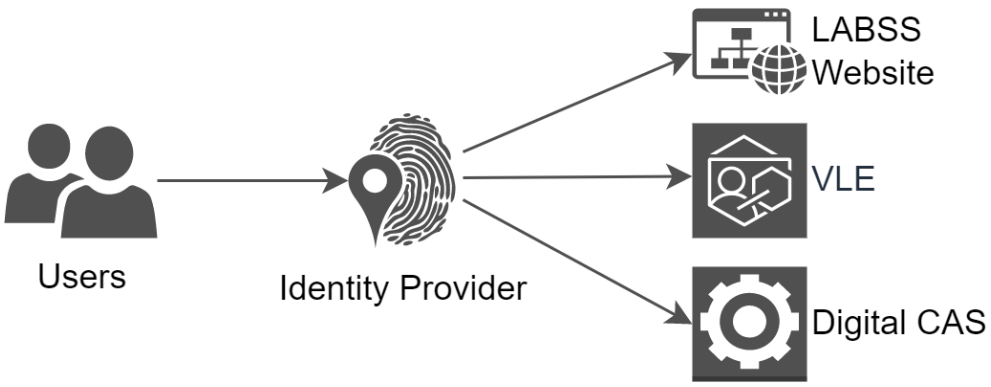
1. Any of the options could allow users to authenticate using basic username/password authentication, however in order to fulfil the requirement of single sign-on between the Digital CAS and the Virtual Learning Environment (VLE) with a single identity, an identity provider is required.

2. The current VLE, Learning Pool, supports single sign-on using the SAML 2.0 authentication protocol. Therefore, any Digital CAS system should ideally support this protocol.

3. During the process of this research, we were not able to identify any pre-existing identity provision platform which is already federated with the 32 local authorities, therefore it will not be possible to allow LA users to log in using their own corporate IDs. However, it would be possible to allow LA users to create an identity with the chosen Identity Provider, which is then used to log into both the VLE and the Digital CAS.

4. There is a stated desire for users to be able to login to the LABSS website using the same credentials they use to log into the VLE and the Digital CAS. This can be accomplished using an external identity provider which supports SAML 2.0, however it may require additional effort from the LABSS website provider to enable external identity provision and single sign-on.

Figure 5.9 - Authentication via an external Identity Provider



5. The following options are available for identity provision:

    - **Scottish Government**

        - The Scottish Government iTECS department maintain an identity provider which can be used by users external to Scottish Government. This identity provider supports the SAML 2.0 protocol and could therefore be used to allow LA users to create accounts and be authenticated for both the VLE and the Digital CAS.

    - **Improvement Service**

        - The Improvement Service maintain an identity provider which, while primarily used for businesses and members of the public, can be used by LA users as well. This identity provider supports the SAML 2.0 protocol and could therefore be used to allow LA users to create accounts and be authenticated for both the VLE and the Digital CAS.

    - **Third Party**

        - A cloud-based identity provider can be procured from and hosted by a third party which would have the same features as those offered by Scottish Government and Improvement Service.

6. Indicative costs for an external identity provider are **£20-100 per month**, however this may be reduced depending on the chosen vendor due to volume discounts or negotiated rates.

6. Risks and Considerations

1. The volume of competency items may raise some challenges in terms of design of a Digital CAS. Success of the Digital CAS will depend on the interface and functionality being as user friendly as possible. Therefore it is important that a proportionate amount of time be spent on user-centred design and user testing in order to achieve a dynamic and user friendly digital CAS.

2. Similarly, the guidance given to LA Building Standards users needs to be carefully considered in order to ensure users understand the purpose and benefits of the CAS process and how this feeds into the building standards profession. It is critical to achieve buy-in from the users.

3. Accessibility needs of users should be considered within the design of the Digital CAS.

4. If a full DSSS panel assessment is required, costs and timescales could increase for each phase of the implementation project by up to 30%, depending on the level of involvement required.

7. Recommendation

7.1 Recommended Approach

1. The recommended implementation for the Digital CAS solution is **Option 3: Development of a bespoke .Net Digital CAS solution.**

2. This is primarily because this option would be tailored to meet the user requirements exactly, and leaves plenty of flexibility for extension to meet any future requirements. This option scored highly for most assessment criteria and minimises the recurring cost of the proposed solution. A bespoke .Net application can be hosted in any preferred cloud hosting solution, and avoids vendor lock-in as the Building Standards Hub would maintain control over the data.

3. The main drawback to this approach is a higher initial implementation cost compared to other approaches.

7.2 Alternative approach

1. An alternative approach for the Digital CAS solution would be **Option 4: Development of a low-code Digital CAS solution within the Microsoft Power Platform.**

2. This approach provides most of the same benefits as option 3. It can be hosted within an identified Azure subscription, and also helps to avoid vendor lock-in. Additionally, it has the same benefits around being tailored to the user requirements and leaves flexibility for future development. However, it should be recognised that whilst user requirements can be met, it will be more difficult to do so compared to the bespoke .Net approach. In addition, compromises will need to be made in terms of the look and feel of the solution, making this approach less attractive than the bespoke .Net approach.

3. Another differentiating factor with this approach is that it has higher recurring costs. This is offset by lower initial development costs, so might be an option if there is a preference to reduce initial capital expenditure at the expense of additional operational (recurring) expenditure.

7.3 Interim Solution

1. Options 1 and 2 should not be considered as a long-term solution, as they do not meet all the expected requirements of the Digital CAS. However, since they can be realised with very little capital expenditure, they might be suitable for consideration as a short-term solution. This might improve the user experience of building standards verifiers in the meantime while further procurement and discovery activities are carried out for the recommended option.

8. Conclusion

1. This report has identified and outlined the technical options available for a Digital CAS solution:
    - Amend existing CAS
    - Leverage existing VLE functionality
    - Bespoke .Net development
    - Low Code development
    - SaaS
2. Costs, strengths and weaknesses are outlined for each option.
3. After technical assessment, the recommended approach is for SG Building Standards Division to consider developing a bespoke .Net Digital CAS solution.
4. Development of a low-code Digital CAS solution within Microsoft Power Platform has been outlined as an alternative approach.
5. Adapting the existing CAS or using existing VLE functionality could be considered as a short-term solution only, as neither option would meet all user requirements.
6. There are risks and considerations to take into account, with suggested solutions.

9. Glossary

1. The following terms are used throughout this document.

Table 9 - Glossary of Terms

Name	Description
BSD	Scottish Government Building Standards Division
CAS	Competency Assessment System
Deep Linking	The use of a hyperlink that links to a specific, generally searchable or indexed, piece of web content on a website rather than the website's home page
DPIA	Data Protection Impact Assessment
DSSS	Digital Service Scotland Standard
iTECS	Scottish Government Information and Technology Services department
LA	Local Authority
LABSS	Local Authority Building Standards Scotland
LMS	Learning Management System
MFA	Multi Factor Authentication
PCF	Professional Competency Framework
SaaS	Software as a Service, i.e. an online service which is paid for on an ongoing Operating Cost basis
SG	Scottish Government
SSO	Single Sign On
VLE	Virtual Learning Environment

10. Appendices

10.1 Digital CAS User Requirements

Table 10.1 Prioritised User Requirements for Digital CAS

User requirement	Priority
Digital CAS should identify skills gaps and provide a direct link to online training platform	Must have
Direct links from identified skills gap to the equivalent training on VLE	Should have
Digital CAS should be available at all times	Must have
Digital CAS should show career progression chart and information	Must have
Digital CAS needs to save user's progress as they complete assessment in iterations	Must have
Digital CAS should have a 'Not Applicable' option for questions	Must have
Digital CAS should have a 'Not Applicable' option for whole sections	Could have
Handbook and toolkit should be integrated and viewable on the same page so that the user does not need to cross reference	Must have
Guidance to CAS should be simpler and easier to read	Must have
Digital CAS/VLE could include status of learning, learning module completion, dates for courses and completion of courses	Could have
Digital CAS accessibility should comply with WCAG	Must have
Combine annual performance review and CAS	Won’t have
Include Graduate Apprentices and Trainees in the framework	Should have
Awareness and experience on the job should be included in CAS process	Won’t have
Digital CAS needs to produce reports	Must have

User requirement	Priority
Digital CAS needs to automatically collate reports to send to Scottish Government	Won’t have
Digital CAS needs to have job role and level pre-filled ready for the user to use immediately	Won’t have
Digital CAS should show skills development progress/action against an identified skill gap	Should have
Digital CAS needs to be easy to navigate and provide a good user experience (e.g. without having to scroll left to right)	Must have
Digital CAS should include links from year to year results for comparisons	Could have
Digital CAS could be a mobile/desktop app	Won’t have
A user should be able to log into LABSS website, Digital CAS and VLE using the same credentials	Should have
Digital CAS needs to have same style as LABSS website to ensure a consistent user experience	Must have

This publication is available at **www.gov.scot**

Any enquiries regarding this publication should be sent to us at

The Scottish Government
St Andrew's House
Edinburgh
EH1 3DG

ISBN: 978-1-80525-604-5 (web only)

Published by The Scottish Government, March 2023

Produced for The Scottish Government by APS Group Scotland, 21 Tennant Street, Edinburgh EH6 5NA
PPDAS1256702 (03/23)

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