



Australian Government  
Department of Education and Training

# **GRANT AGREEMENT**

## **IN RELATION TO DEVELOPMENT OF AN ONLINE NATIONAL ASSESSMENT PLATFORM**

**Commonwealth of Australia** represented by the  
Department of Education and Training

**ABN 12 862 898 150**

**Education Services Australia Limited**

**ABN 18 007 342 421**

## CONTENTS

<b>1.</b>	<b>Interpretation</b>	<b>1</b>
1.1.	Definitions	1
1.2.	Interpretation	6
1.3.	Construction of agreement	6
1.4.	Term of Agreement	6
<b>2.</b>	<b>Project</b>	<b>6</b>
2.1.	Your principal obligations	6
<b>3.</b>	<b>Funding</b>	<b>7</b>
3.1.	Payment	7
3.2.	Use of Funding	7
3.3.	Budget	7
3.4.	Keeping of Funding	7
3.5.	Records	8
3.6.	Repayments	8
3.7.	Debt and Interest	9
<b>4.</b>	<b>Taxes, duties and government charges</b>	<b>9</b>
<b>5.</b>	<b>Subcontractors and Specified Personnel</b>	<b>9</b>
5.1.	Subcontractors	9
5.2.	Specified Personnel	10
5.3.	Your responsibility	10
<b>6.</b>	<b>Assets</b>	<b>10</b>
6.1.	Acquisition of Assets	10
6.2.	Your responsibilities for Assets	11
6.3.	Sale or Disposal of Assets	11
6.4.	Loss, damage etc of Assets	11
6.5.	Dealing with Assets	12
<b>7.</b>	<b>Liaison, monitoring and review</b>	<b>12</b>
7.1.	Liaise and comply	12
7.2.	Final Evaluation	12
<b>8.</b>	<b>Reporting</b>	<b>12</b>
8.1.	Reporting	12
<b>9.</b>	<b>Intellectual Property</b>	<b>14</b>
9.1.	Use of Commonwealth Material	14
9.2.	Intellectual Property in Project Material	14
9.3.	Moral Rights	16

Our Initials: NdB

Your Initials: Sy

<b>10.</b>	<b>Disclosure of Information</b>	<b>16</b>
10.1.	Confidential Information not to be disclosed	16
10.2.	Written undertakings	17
10.3.	Exceptions to obligations	17
10.4.	Period of confidentiality	17
10.5.	General	17
<b>11.</b>	<b>Privacy</b>	<b>18</b>
11.1.	Interpretation	18
11.2.	Your obligations in relation to privacy	18
<b>12.</b>	<b>Acknowledgement and publicity</b>	<b>18</b>
12.1.	Acknowledgement of support	18
12.2.	Right to publicise Funding	18
12.3.	No restriction on advocacy	18
<b>13.</b>	<b>Dealing with Copies and Access to Documents</b>	<b>19</b>
13.1.	Interpretation	19
13.2.	Actions at end of agreement	19
13.3.	Access to documents	19
<b>14.</b>	<b>Liability</b>	<b>19</b>
14.1.	Indemnity	19
<b>15.</b>	<b>Dispute resolution</b>	<b>20</b>
15.1.	Procedure for dispute resolution	20
15.2.	Costs	21
15.3.	Continued performance	21
15.4.	Exemption	21
<b>16.</b>	<b>Termination or reduction in scope of Project</b>	<b>21</b>
16.1.	Termination or reduction with costs	21
16.2.	Termination for breach	22
16.3.	Preservation of other rights	23
<b>17.</b>	<b>Notices</b>	<b>23</b>
17.1.	Format, addressing and delivery	23
17.2.	When received	24
<b>18.</b>	<b>Corporate Governance</b>	<b>24</b>
18.1.	Constitution	24
18.2.	Notification	24
18.3.	Management	24
<b>19.</b>	<b>General provisions</b>	<b>25</b>
19.1.	Audit and access	25

Our Initials: N/A

Your Initials: Soy

19.2.	Insurance	25
19.3.	Extension of provisions to subcontractors and Personnel	26
19.4.	Conflict of interest	26
19.5.	Relationship of parties	26
19.6.	Waiver	27
19.7.	Variation	27
19.8.	Assignment and Novation	27
19.9.	Survival	27
19.10.	Compliance with Laws and Our Policies	28
19.11.	Applicable law	28
	<b>Schedule L. AGREEMENT Details</b>	<b>29</b>
A.	Programme and Project	29
B.	Funding and Payment	35
C.	Budget	39
D.	Project Officer	39
E.	Subcontractors	39
F.	Specified Personnel	39
G.	Assets	40
H.	Review	40
I.	Reporting	41
J.	Commonwealth Material	43
K.	Existing Material	43
L.	Moral Rights	43
M.	Confidential Information	43
N.	Privacy Conditions, Restrictions or Guidelines	43
O.	Acknowledgement and Publicity	44
P.	Our Address for Notices	44
Q.	Your Address for Notices	45
R.	Insurance	45
S.	Compliance with Laws and Policies	45

Our Initials: ACD

Your Initials: SD

## AGREEMENT

### Parties

This agreement is made between and binds the following parties:

1. **Commonwealth of Australia** ('Commonwealth', 'Us', 'We' or 'Our') represented by and acting through the Department of Education and Training, ABN 12 862 898 150 ('Department')
2. **Education Services Australia Limited**, ABN 18 007 342 421, Australian Public Company Limited by Guarantee registered under the *Corporations Act 2001*, having its registered office at Level 5, 440 Collins Street, Melbourne Victoria 3000. ('You', or 'Your')

### Context

- A. Australian education ministers are committed to reforming national assessment by moving it online, with a focus on the National Assessment Program – Literacy and Numeracy (NAPLAN). A technical platform is required to deliver online assessments. Education Services Australia, as a ministerially owned company, is best placed to develop the online assessment platform for the Australian education sector. The Department of Education and Training is funding Education Services Australia (ESA) for development of the online assessment platform as its contribution to the overall programme of work to transition the education sector to online assessment.
- B. You are committed to helping achieve the Objectives of the Programme through Your conduct of the Project.
- C. As a result of this commitment, We agree to support the Project by providing the Funding to You, subject to the terms and conditions of this agreement.
- D. You agree to accept the Funding on the terms and conditions set out in this agreement.

## OPERATIVE PROVISIONS

### 1. Interpretation

#### 1.1. Definitions

- 1.1.1. In this agreement, unless the context indicates otherwise:

<b>Asset</b>	means any item or property, purchased, leased, hired, financed, created or otherwise brought into existence either wholly or in part with the use of the Funding which has a value of over \$5,000 inclusive of GST but excludes any Intellectual Property rights;
<b>Australian Accounting Standards</b>	refers to the standards of that name maintained by the Australian Accounting Standards Board created by section 226 of the <i>Australian Securities and Investments Commission Act 2001</i> (Cth);
<b>Australian Auditing</b>	refers to the standards made by the Auditing and Assurance Standards

Our initials: NAB

Your initials: SA

<b>Standards</b>	Board created by section 227A of the <i>Australian Securities and Investments Commission Act 2001</i> (Cth);
<b>Budget</b>	means the budget, if any, set out in Item C of Schedule 1;
<b>Business Day</b>	means in relation to the doing of any action in a place, any day other than a Saturday, Sunday or public holiday in that place;
<b>CCBY Licence</b>	means a Creative Commons Attribution 3.0 Australia ( <a href="http://creativecommons.org/licenses/by/3.0/au/">http://creativecommons.org/licenses/by/3.0/au/</a> ) licence;
<b>Commonwealth Coat of Arms</b>	means the Commonwealth Coat of Arms as set out at <i>It's an Honour – Commonwealth Coat of Arms</i> available at <a href="http://www.itsanhonour.gov.au/coat-arms/index.cfm">http://www.itsanhonour.gov.au/coat-arms/index.cfm</a> ;
<b>Commonwealth Material</b>	means any Material: <ul style="list-style-type: none"> <li>a. provided by Us to You for the purposes of this agreement; or</li> <li>b. derived at any time from the Material referred to in paragraph a;</li> </ul> and does not include Project Material;
<b>Completion Date</b>	means the day after You have done all that You are required to do under this agreement to Our satisfaction;
<b>Date of this Agreement</b>	means the date written at the top of the signature page of this agreement, and if no date or more than one date is written there, then the date on which this agreement is signed by the last party to do so;
<b>Department</b>	means the Department of Education and Training and includes any department, agency or authority of the Commonwealth which is from time to time responsible for administering this agreement;
<b>Depreciated</b>	means the amount representing the same reduced value of an Asset as calculated for income tax purposes under, and in accordance with, the <i>Income Tax Assessment Act 1936</i> and the <i>Income Tax Assessment Act 1997</i> ;
<b>Existing Material</b>	means any Material, except Commonwealth Material, which was in existence before the Date of this Agreement or which is developed independently of this agreement and which is incorporated in, supplied with or as part of, or required to be supplied with or as part of, the Project Material and includes, but is not limited to, Material specified in Item K of Schedule 1;
<b>Funds or Funding</b>	means the amounts (in cash or kind) payable by Us under this agreement as specified in Item B of Schedule 1 (including that identified

Our initials: NCS

Your initials: ST

	in Item B of Schedule 1 as already being held by You) and also includes interest earned on the Funding;
<b>Guidelines</b>	refers to the guidelines for the Programme, if any, as described in Item A of Schedule 1;
<b>Intellectual Property</b>	<p>Includes:</p> <ul style="list-style-type: none"> <li>a. all copyright (including rights in relation to phonograms and broadcasts);</li> <li>b. all rights in relation to inventions, plant varieties, trademarks (including service marks), designs and circuit layouts; and</li> <li>c. all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields,</li> </ul> <p>but does not include:</p> <ul style="list-style-type: none"> <li>d. Moral Rights;</li> <li>e. the non-proprietary rights of performers; or</li> <li>f. rights in relation to confidential information;</li> </ul>
<b>Interest</b>	means interest calculated at the general interest charge rate for a day determined under section 8AAD of the <i>Taxation Administration Act 1953</i> (Cth), on a daily compounding basis;
<b>Material</b>	means any thing in relation to which Intellectual Property rights arise;
<b>Milestone</b>	means a stage of completion of the Project as set out in item A of Schedule 1;
<b>Moral Rights</b>	<p>means the following non-proprietary rights of authors of copyright Material:</p> <ul style="list-style-type: none"> <li>a. the right of attribution of authorship;</li> <li>b. the right of integrity of authorship; and</li> <li>c. the right not to have authorship falsely attributed;</li> </ul>
<b>Objectives</b>	means the objectives of the Programme described in Item A of Schedule 1;
<b>Our Confidential Information</b>	<p>means Our information that:</p> <ul style="list-style-type: none"> <li>a. is described in item M of Schedule 1;</li> <li>b. We identify, by notice in writing to You after the Date of this Agreement as confidential information for the purposes of this agreement; or</li> </ul>

Our Initials: ndd  
Your Initials: RL

<b>Personal Information</b>	c. You know or ought to know by its nature is confidential;
<b>Personnel</b>	has the same meaning as it has in section 6 of the Privacy Act; means: <ul style="list-style-type: none"> <li>a. in relation to You - any natural person who is an officer, employee, agent or professional advisor of You or Your subcontractors; and</li> <li>b. in relation to Us - any natural person, other than a person referred to in paragraph a, who is an officer, employee, agent or professional advisor of Us;</li> </ul>
<b>Privacy Act</b>	means <i>Privacy Act 1988</i> (Cth);
<b>Project Officer</b>	means the person specified (by name or position) in Item D of Schedule 1 or any substitute notified to You;
<b>Programme</b>	means the programme specified in Item A of Schedule 1;
<b>Project</b>	means the project described in item A of Schedule 1 and includes the provision to Us of the Project Material specified in item A of Schedule 1;
<b>Project Material</b>	means any Material: <ul style="list-style-type: none"> <li>a. created for the purposes of this agreement;</li> <li>b. provided or required to be provided to Us under the agreement; or</li> <li>c. derived at any time from the Material referred to in paragraphs a. or b.;</li> </ul> and includes <ul style="list-style-type: none"> <li>d. any Existing Material incorporated in the Material referred to in paragraphs a. to c.; and</li> <li>e. any Reports.</li> </ul>
<b>Project Period</b>	means the period specified in Item A of Schedule 1 during which the Project must be completed;
<b>Term</b>	refers to the period described in clause 1.4;
<b>Third Party Material</b>	means any Project Material or Existing Material the Intellectual Property in which is not owned by, or assigned to, You or Us

Our Initials:   ND  

Your initials:   JF



<b>Qualified Accountant</b>	means a person who is a member of the Institute of Chartered Accountants in Australia or of CPA Australia;
<b>Records</b>	Includes documents, information and data stored by any means and all copies and extracts of the same;
<b>Report</b>	means Project Material that is provided for reporting purposes under clause 8 and as stipulated in item I of Schedule 1;
<b>Specified Personnel</b>	means the Personnel, or people with specific skills, specified in item F of Schedule 1 as required to undertake all or part of the Project;
<b>Term</b>	refers to the period described in clause 1.4;
<b>Undepreciated</b>	means the value of an Asset which has not been Depreciated;
<b>Your Confidential Information</b>	means Your information that: <ul style="list-style-type: none"> <li>a. is described in item M of Schedule 1; or</li> <li>b. You identify, by notice in writing to Us after the Date of this Agreement as confidential information for the purposes of this agreement.</li> </ul>

## 1.2. Interpretation

- 1.2.1. In this agreement, unless the contrary intention appears:
- a. words importing a gender include any other gender;
  - b. words in the singular include the plural and vice versa;
  - c. clause headings are for convenient reference only and have no effect in limiting or extending the language of provisions to which they refer;
  - d. a reference to a person includes a partnership and a body whether corporate or otherwise;
  - e. a reference to dollars is a reference to Australian dollars;
  - f. a reference to any legislation or legislative provision includes any statutory modification, substitution, re-enactment, or successor of that legislation or legislative provision;
  - g. if any word or phrase is given a defined meaning, any other part of speech or other grammatical form of that word or phrase has a corresponding meaning;
  - h. a reference to an item is a reference to an item in a schedule; a reference to a schedule (or an attachment) is a reference to a schedule (or an attachment) to this agreement, including as amended or replaced from time to time by agreement in writing between the parties; and

Our Initials: NCH

Your Initials: LS

- i. a reference to writing is a reference to any representation of words, figures or symbols, whether or not in a visible form.

**1.2.2. This agreement consists of:**

- a. this document;
- b. any schedules;
- c. any annexure or other attachments; and
- d. any document incorporated by reference.

**1.2.3. In the event of any conflict or inconsistency between any part of:**

- a. the terms and conditions contained in the clauses of this agreement;
- b. the schedules;
- c. the annexure or other attachments, if any;
- d. documents incorporated by reference, if any;

then the material in any one of paragraphs a. to c. above has precedence over the material in a subsequent paragraph, to the extent of any conflict or inconsistency.

**1.3. Construction of agreement**

**1.3.2. This agreement records the entire agreement between the parties in relation to its subject matter.**

**1.3.3. As far as possible all provisions of this agreement will be construed so as not to be void or otherwise unenforceable.**

**1.3.4. If anything in this agreement is void or otherwise unenforceable then it will be severed and the rest of the agreement remains in force.**

**1.3.5. A provision of this agreement will not be construed to the disadvantage of a party solely on the basis that it proposed that provision.**

**1.4. Term of Agreement**

- i) This agreement commences on the Date of this Agreement and, unless terminated earlier, it expires on the Completion Date.

**2. Project**

**2.1. Your principal obligations**

**2.1.2. You must carry out the Project:**

- a. as specified in Item A of Schedule 1;
- b. to achieve the Objectives;
- c. within the Project Period;
- d. in accordance with this agreement and any Guidelines; and

Our Initials:   *LD*  

Your Initials:   *LD*

e. diligently, effectively and to a high standard.

2.1.3. You must not act in a way that may bring the Project into disrepute.

### **3. Funding**

#### **3.1. Payment**

3.1.1. Subject to sufficient funds being available for the Programme, and compliance by You with this agreement (including the requirements specified in item B of Schedule 1) We will provide You with the Funding at the times and in the manner specified in item B of Schedule 1.

3.1.2. Without limiting Our rights, We may withhold or suspend any payment in whole or in part until You have performed Your obligations under this agreement.

3.1.3. We may reduce the amount of Funding payable under this agreement where You:

- a. owe money to Us; or
- b. have money that You should have, but have not yet, acquitted, under any arrangement with Us (whether contractual, statutory or otherwise).

3.1.4. If We exercise Our rights under clauses 3.1.2 or 3.1.3, You must continue to perform any obligations under this agreement, unless We agree otherwise in writing.

#### **3.2. Use of Funding**

3.2.1. The Funding must be expended by You only for the Project.

3.2.2. You must do all things necessary to ensure that all payments from the Funding that You make to third parties (including subcontractors) are correctly made and properly authorised and that You maintain proper and diligent control over the incurring of all liabilities.

3.2.3. You must not use the Funds, the agreement or any of Our obligations under the agreement, the Assets or Intellectual Property rights in Project Material:

- a. as security to obtain, or comply with, any form of loan, credit, payment or other interest; or
- b. for the preparation of, or in the course of, any litigation.

#### **3.3. Budget**

3.3.1. You must only spend the Funding in accordance with the Budget and the conditions specified in item C of Schedule 1.

3.3.2. You must obtain prior written approval from Us for any changes to the Budget.

#### **3.4. Keeping of Funding**

3.4.1. You must:

Our Initials:   V.D.  

Your Initials:   B.F.

- a. ensure that the Funds are held in an account in Your name, and which You solely control, with a deposit-taking Institution authorised under the *Banking Act 1959* (Cth) to carry on banking business in Australia; and
- b. If specified in Item B of Schedule 1, ensure the account is:
  - i. established solely to account for and administer, Funding provided by Us to You under this agreement; and
  - ii. separate from Your other operational accounts;
 and
- c. on request from Us, provide Us and the authorised deposit-taking institution with an authority for Us to obtain all details relating to any use of the account.

### **3.5. Records**

- 3.5.1. You must create and maintain full and accurate financial and other Records relating to the Project including:
  - a. progress against Milestones;
  - b. the creation, acquisition and disposal of Assets;
  - c. the creation of Intellectual Property rights in Project Material;
  - d. to enable all income and expenditure related to the Project and all interest earned on the Funding to be identifiable and ascertainable in Your accounts;
  - e. to enable the preparation of financial statements in accordance with Australian Accounting Standards; and
  - f. to enable the audit of those Records in accordance with Australian Auditing Standards.
- 3.5.2. You agree to retain the accounts and Records created under clause 3.5 for a period of no less than 7 years after the end of the Project Period.

### **3.6. Repayments**

- 3.6.2. If, at any time, We determine that:
  - a. an overpayment has occurred for any reason, including where an invoice is found to have been incorrectly rendered after payment; or
  - b. there remains an amount of Funding that has not been spent or legally committed for expenditure in accordance with the agreement to Our satisfaction and the period in which that Funding was expected to be spent or legally committed has passed; or
  - c. Funding has not been spent in accordance with the agreement; or
  - d. Funding has not been acquitted to Our satisfaction,
 then at Our discretion You agree to repay this amount to Us. This amount must be repaid within 20 Business Days of a notice from Us, dealt with as notified by Us or We

Our Initials: Adh

Your Initials: Sy

may offset that amount against any amount subsequently due to You under this agreement or any other arrangement between the parties.

**3.7. Debt and Interest**

- 3.7.1. You agree to pay any amount owed or payable to Us or which We are entitled to recover from You under this agreement, including any Interest, without prejudice to any other rights available to Us under the agreement, under statute, at law or in equity, at Our discretion, as a debt due to Us by You without further proof of the debt by Us being necessary.
- 3.7.2. If We notify You that an amount is to be refunded or repaid to Us and the amount is not refunded or repaid within 20 Business Days, or as otherwise notified by Us, You agree to pay interest, unless We notify You otherwise, on the amount outstanding after the expiry of the date it was due, until the amount is paid in full.
- 3.7.3. In respect to any obligation You may have under this agreement to pay Us interest, You agree that the interest represents a reasonable pre-estimate of the loss incurred by Us.

**4. Taxes, duties and government charges**

- 4.1.1. You agree to pay all taxes, duties and government charges imposed or levied in Australia or overseas in connection with the performance of this agreement.

**5. Subcontractors and Specified Personnel**

**5.1. Subcontractors**

- 5.1.1. You must not subcontract the performance of any part of the Project without Our prior written approval.
- 5.1.2. We may impose any conditions We consider appropriate when giving Our approval under clause 5.1.
- 5.1.3. We have approved the subcontracting of the performance of the parts of the Project to the persons, and subject to the conditions (if any), specified in Item E of Schedule 1.
- 5.1.4. You are fully responsible for the performance of Your obligations under this agreement, even if You subcontract some or all of Your obligations. Despite any approval given by Us, You are responsible for ensuring the suitability of a subcontractor for the work proposed to be carried out and for ensuring that the work meets the requirements of this agreement.
- 5.1.5. You must make available to Us (if requested), details of all subcontractors engaged in the performance of the Project.
- 5.1.6. You acknowledge, and must inform all subcontractors that, We may publicly disclose the names of any subcontractors engaged in the performance of the Project.
- 5.1.7. We may revoke Our approval of a subcontractor on any reasonable ground by giving written notice to You. On receipt of the notice You must, at Your own cost, promptly

Our initials: ADB

Your initials: ST

cease using that subcontractor and arrange their replacement with Personnel or another subcontractor acceptable to Us.

- 5.1.8. If we withdraw Our approval of a subcontractor, You remain liable under this agreement for past acts or omissions of Your subcontractors as if they were current subcontractors.
- 5.1.9. You agree, in any subcontract placed with a subcontractor, to reserve a right of termination to take account of Our rights of termination under clause 16 and You agree to make use of that right in the event of termination or revocation by Us.
- 5.1.10. You must not enter into a subcontract under this agreement with a subcontractor named by the Workplace Gender Equality Agency as an employer currently not complying with the *Workplace Gender Equality Act 2012* (Cth).

## **5.2. Specified Personnel**

- 5.2.1. You must ensure that the Specified Personnel will perform work in relation to the Project in accordance with this agreement.
- 5.2.2. If Specified Personnel are unable to perform the work as required under clause 5.2.1, You must notify Us immediately.
- 5.2.3. You must, at Our request acting in Our absolute discretion, remove Personnel (including Specified Personnel) from work in relation to the Project.
- 5.2.4. If clause 5.2.2 or clause 5.2.3 applies, You must provide replacement Personnel acceptable to Us at no additional cost and at the earliest opportunity.
- 5.2.5. If You are unable to provide acceptable replacement Personnel, We may terminate this agreement under clause 16.2.

## **5.3. Your responsibility**

- 5.3.1. You are fully responsible for the performance of the Project and for ensuring compliance with the requirements of this agreement, and will not be relieved of that responsibility because of any:
  - a. involvement by Us in the performance of the Project;
  - b. subcontracting of the Project;
  - c. acceptance by Us of Specified Personnel; or
  - d. payment of any amount of Funding to You.

## **6. Assets**

### **6.1. Acquisition of Assets**

- 6.1.1. You must not use the Funding to acquire or create any Asset, apart from those detailed in item G of Schedule 1, without obtaining Our prior written approval. Our approval may be subject to any conditions We may impose.

Our initials: NLD

Your initials: RP

- 6.1.2. Unless it is specified in item G of Schedule 1 that We own the Asset then You must ensure that You own any Asset acquired with the Funding. If We own the Asset, clauses 6.3, 6.5.2 and 6.5.3 do not apply.

**6.2. Your responsibilities for Assets**

- 6.2.1. During the Project Period You must:
- a. Use any Asset in accordance with this agreement and for the purposes of the Project;
  - b. not encumber or dispose of any Asset, or deal with or use any Asset other than in accordance with this clause 6 without Our prior written approval;
  - c. safeguard all Assets against theft, loss, damage, or unauthorised use;
  - d. maintain all Assets in good working order;
  - e. maintain all appropriate insurances for all Assets to their full replacement value, noting Our interest in the Asset under this agreement, and provide satisfactory evidence of this on request from Us;
  - f. if required by law, maintain registration and licensing of all Assets;
  - g. be fully responsible for, and bear all risks relating to, the use or disposal of all Assets;
  - h. if specified in item G of Schedule 1, maintain an Assets register in the form and containing the details as described in item G in Schedule 1; and
  - i. when requested by Us, provide copies of the Assets register to Us.

**6.3. Sale or Disposal of Assets**

- 6.3.1. If You sell or otherwise dispose of an Asset during the Project Period (which must be with Our prior written consent and subject to any conditions We may impose), the greater of the following proportions forms part of the Funding and must be used for the Activity or is otherwise recoverable as Funding:
- a. the proportion of sale proceeds from the Asset; or
  - b. the proportion of the Undepreciated value of the Asset,
- that is equivalent to the proportion of the cost of the Asset that was funded from the Funding.

**6.4. Loss, damage etc of Assets**

- 6.4.1. If any of the Assets are lost, damaged or destroyed, You must reinstate the Assets including from the proceeds of the insurance and this clause 6 continues to apply to the reinstated Assets. Any surplus from the proceeds of the insurance must be notified to Us and used and accounted for as Funding under this agreement.

Our Initials: N/A

Your Initials: Cof

**6.5. Dealing with Assets**

- 6.5.1. On expiry of the Project Period or earlier termination of this agreement We may require You to deal with Assets as We may, at Our sole discretion, direct in writing.
- 6.5.2. Subject to clause 6.5.3, if on expiry of the Project Period or earlier termination of the agreement, an Asset has not been fully Depreciated, We may, by written notice, require You to:
- a. pay to Us within 20 Business Days of the expiry of the Project Period or earlier termination of this agreement, an amount equal to the proportion of the Undepreciated value of the Asset that is equivalent to the proportion of the cost of the Asset that was funded from the Funding;
  - b. sell the Asset for the best price reasonably obtainable and pay to Us within 20 Business Days of the sale the proportion of the proceeds of the sale that is equivalent to the proportion of the cost of the Asset (less an amount equal to the reasonable disposal costs incurred by You) that was funded from the Funding; or
  - c. continue to use the Asset for the purposes, and in accordance with any conditions notified by the Agency.
- 6.5.3. We may in our sole discretion decide that amounts payable to Us under clause 6.5.2 form part of the Funding.

**7. Liaison, monitoring and review**

---

**7.1. Liaise and comply**

- 7.1.1. You must:
- a. liaise with and provide information to Us as reasonably required and notified by Us; and
  - b. comply with all Our reasonable requests, directions or monitoring requirements.

**7.2. Final Evaluation**

- 7.2.1. If specified in Item H of Schedule 1 You must:
- a. provide all reasonable assistance required by Us;
  - b. respond to all Our reasonable requests; and
  - c. provide any information We reasonably require,
- in relation to conducting a final evaluation of the Programme.

**8. Reporting**

---

**8.1. Reporting**

- 8.1.1. You must provide Us with Reports in relation to the Project at the times and in the manner specified in Item I of Schedule 1.

Our initials: AKD

Your initials: JS



- 8.1.2. Unless clause 8.1.4 applies, within 20 Business Days (or other period specified in item I of Schedule 1 or as otherwise notified) of the end of the Project Period You must provide Us with:
- a. an audited detailed statement of income and expenditure in respect of the Funding which must include a definitive statement as to whether the financial accounts are true and fair and a statement of the balance of Your account referred to in clause 3.4.1.b.;
  - b. an audit statement that the Funding was expended for the Project and in accordance with this agreement.
- 8.1.3. The audits referred to in clause 8.1.2 must:
- a. comply with the Australian Auditing Standards;
  - b. be carried out by a person who is:
    - i. registered as a company auditor under the *Corporations Act 2001* (Cth), or a member of the Institute of Chartered Accountants in Australia (who is entitled to use the letters CA or FCA), or of CPA Australia (who is entitled to use the letters CPA or FCPA) or the Institute of Public Accountants (IPA) (who is entitled to use the letters MIPA or FIPA); and
    - ii. not a principal, member, shareholder, officer, agent, subcontractor, employee or related entity of You or of a related body corporate (the terms 'related entity' of You and 'related body corporate' have the same meaning as in section 9 of the *Corporations Act 2001* (Cth)); and
    - iii. not Your Qualified Accountant.
- 8.1.4. If You are audited by the Auditor-General or a State or Territory Auditor-General:
- a. for the Term; and
  - b. the Funding is included in the income and expenditure which is subject to the audit,
- then instead of the audits referred to in clause 8.1.2, You may provide Us with:
- i. a detailed statement of income and expenditure for the Funding which must include a definitive statement as to whether the financial accounts are true and fair, and a statement of the balance of Your account referred to in clause 3.4.1.b.; and
  - ii. a statement that the Funding was expended for the Project and in accordance with this agreement.
- 8.1.5. The statements referred to in clause 8.1.4(i) and (ii) must
- a. contain the details, if any, described in item I of Schedule 1;
  - b. be certified by Your chief executive officer and the senior executive officer employed by You who has primary responsibility for managing Your audit function; and

Our Initials:     

Your Initials:

- c. be provided to Us within 20 Business Days (or other period specified in item I of Schedule 1 or as otherwise notified) of the end of the Project Period.

## **9. Intellectual Property**

### **9.1. Use of Commonwealth Material**

- 9.1.2. Subject to clause 9.1.4, We grant (or will procure) a royalty-free, non-exclusive licence for You to use, reproduce and adapt the Commonwealth Material for the purposes of this agreement.
- 9.1.3. You must use the Commonwealth Material strictly in accordance with any conditions or restrictions set out in item J of Schedule 1, and any direction from Us including under clause 13.2.
- 9.1.4. You must keep the Commonwealth Material safe.
- 9.1.5. You must not use the Commonwealth Coat of Arms for the purposes of this agreement.

### **9.2. Intellectual Property in Project Material**

- 9.2.1. Subject to this clause 9.2, Intellectual Property in all Project Material vests or will immediately vest in You.
- 9.2.2. Clause 9.2.1 does not affect the ownership of Intellectual Property in:
  - a. any Commonwealth Material incorporated into Project Material; or
  - b. any Existing Material; or
  - c. any Third Party Material.
- 9.2.3. You grant (or will procure for) Us a permanent, irrevocable, royalty-free, world-wide, non-exclusive licence (including a right of sub-licence) to use, reproduce, adapt, modify, perform, distribute, communicate and exploit the Intellectual Property Rights in the Project Material (with the exception of Third Party Material including off-the-shelf software) for any Commonwealth purpose.
- 9.2.4. You grant (or will procure for) Us a permanent, irrevocable, free, worldwide, non-exclusive licence (including a right of sub-licence) to use, reproduce, adapt, modify, perform, distribute, communicate and exploit the Intellectual Property rights in the Existing Material (with the exception of Third Party Material including commercial off-the-shelf software) for any Commonwealth purpose.
- 9.2.5. Subject to clause 9.2.6, You grant to Us (or must arrange for the grant to Us of) a permanent, Irrevocable, free, worldwide, non-exclusive licence (including a right of sub-licence) to use, reproduce, adapt, modify, perform, distribute, communicate and exploit the Intellectual Property rights in the Third Party Material (except commercial off-the-shelf software) for any Commonwealth purpose related to the objectives of the Project.

Our initials: By NLS  
Your initials: BY

9.2.6.

- a. Subject to this clause 9.2.6, if, despite Your best endeavours, You cannot fully comply with clause 9.2.5 in relation to any Third Party Material, You must:
  - i. notify Us immediately of the Third Party Material and the terms of the licence that You can arrange for the grant to Us for that Third Party Material; and
  - ii. arrange for the grant to Us of a licence in the Third Party Material on the terms as notified to Us.
- b. The licence that You arrange for the grant to Us in the Third Party Material must not be less favourable than the licence granted to You in that Material.
- c. The licence that You arrange for the grant to Us in the Third Party Material must, at a minimum, extend to using, reproducing, adapting and communicating the Third Party Material for any purpose related to the objectives of the Project, including the right to sub-licence that licence.

9.2.7. If You become aware that We will require a licence for commercial off-the-shelf software in order to exercise Our rights under the licences granted under this clause 9 You must notify Us immediately and provide Us with all the necessary details to obtain a licence over such software including the name, version and manufacturer of the software.

9.2.8.

- a. You agree that the licences granted in clauses 9.2.3, 9.2.4 and 9.2.5 include a right for Us to licence the Project Material and Existing Material and Third Party Material to the public under a CCBY Licence [see <http://creativecommons.org/licenses/by/3.0/au/deed.en>]. In accordance with the timeframe specified in Item A of Schedule 1 for provision of the Project Material, You must provide Us with all author or licensor attribution details in order for Us to comply with the CCBY Licence conditions.
- b. For the avoidance of doubt, this clause 9.2.8 does not apply to any licences granted under clause 9.2.6.

9.2.9. You must obtain, including from third parties, all consents, licences and undertake necessary measures in order to enable intended end users of the Project to lawfully use the Project Material, Existing Material and Third Party Material in accordance with Your Project obligations specified in Schedule 1

9.2.10. You must, on Our request, create, sign, execute or otherwise deal with any document necessary or desirable to give effect to this clause 9.2.

9.2.11. You warrant that:

- a. You are entitled; or
- b. You will be entitled at the relevant time,

to deal with the Intellectual Property in the Project Material in the manner provided for in this clause 9.2.

Our initials: NLD

Your initials: SAF

- 9.2.12. If requested by Us, You must provide to Us a copy of the Project Material in the form requested by Us.

**9.3. Moral Rights**

- 9.3.1. In this clause 9.3:

**Permitted Acts** means any of the following classes or types of acts or omissions:

- a. using, reproducing, adapting or exploiting all or any part of the Project Material, with or without attribution or authorship;
  - b. supplementing the Project Material with any other Material;
  - c. using the Project Material in a different context to that originally envisaged;
  - d. releasing the Project Material to the public under a CCBY Licence, and
  - e. the acts or omissions, specifically set out in item L of Schedule 1;
- but does not include false attribution of authorship.

- 9.3.2. Where You are a natural person and the author of the Project Material, You consent to the performance of the Permitted Acts by Us or any person claiming under or through Us (whether occurring before or after the consent is given).

- 9.3.3. Where clause 9.3.2 does not apply, You must obtain from each author of any Project Material (except Third Party Material) a written consent which extends directly or indirectly to the performance of the Permitted Acts by Us or any person claiming under or through Us (whether occurring before or after the consent is given) and, on request, to provide the executed original of any such consent to Us.

- 9.3.4. You agree to use Your best endeavours to obtain from each author of any Third Party Material a written consent which extends directly or indirectly to the performance of the Permitted Acts by Us or any person claiming under or through Us (whether occurring before or after the consent is given) and, on request, to provide the executed original of any such consent to Us.

- 9.3.5. You must ensure any consent You obtain from any authors of Third Party Material in relation to Moral Rights extends to Us and on the same terms.

- 9.3.6. This clause 9.3 does not apply to any Commonwealth Material incorporated in the Project Material.

**10. Disclosure of Information**

---

**10.1. Confidential Information not to be disclosed**

- 10.1.1. Subject to clause 10.3:

- a. You must not, without Our prior written approval, disclose any of Our Confidential Information to a third party; and

Our initials: JS/ALB  
Your initials: Sez

- b. We must not, without Your prior written approval, disclose any of Your Confidential Information to a third party.
- 10.1.2. In giving written approval to disclosure, a party may impose such conditions as it thinks fit, and the other party agrees to comply with those conditions.
- 10.2. Written undertakings**
- 10.2.1. We may at any time require You to arrange for any person engaged in, or in relation to, the performance or management of this agreement (including Personnel and subcontractors) to give a written undertaking in a form acceptable to Us relating to the use and non-disclosure of Our Confidential Information.
- 10.2.2. If You receive a request under clause 10.2 You must promptly arrange for all undertakings to be given.
- 10.3. Exceptions to obligations**
- 10.3.1. The obligations on the parties under this clause 10 will not be breached if information:
- a. is disclosed by Us to the responsible Minister;
  - b. is disclosed by Us, in response to a request by a House or a Committee of the Parliament of the Commonwealth of Australia;
  - c. is shared by Us within the Department, or with another Commonwealth agency, where this serves the Commonwealth's legitimate interests;
  - d. is authorised or required by law to be disclosed; or
  - e. is in the public domain otherwise than due to a breach of this clause 10.
- 10.4. Period of confidentiality**
- 10.4.1. The obligations under this clause 10 continue:
- a. in relation to an item of information described in item M of Schedule 1 - for the period set out in that item;
  - b. in relation to any information identified in writing after the Date of this Agreement as confidential information for the purposes of this agreement - for the period agreed by the parties in writing; and
  - c. in relation to Our information that You know or ought to know by its nature is confidential - until the information is released into the public domain otherwise than by a breach of this agreement.
- 10.5. General**
- 10.5.1. You agree to secure all Our Confidential Information against loss and unauthorised access, use, modification or disclosure.
- 10.5.2. Nothing in this clause 10 limits Your obligations under clause 11 [Privacy], clause 13.3 [Access to Documents] or clause 19.1 [Audit and Access].

Our initials: N.A.B.

Your initials: SK

## **11. Privacy**

---

### **11.1. Interpretation**

#### **11.1.1. In this clause 11:**

**Australian Privacy Principles** has the same meaning as it has in section 6 of the Privacy Act.

### **11.2. Your obligations in relation to privacy**

#### **11.2.1. You agree, in providing the Project:**

- a. not to do any act or engage in any practice which, if done or engaged in by Us, would be a breach of an Australian Privacy Principle; and
- b. to comply with any conditions, restrictions or guidelines referred to in, or relating to the matters set out in item N of Schedule 1, to the extent that they are consistent with the Australian Privacy Principles.

#### **11.2.2. You agree to notify Us immediately if You become aware of a breach or possible breach of any of Your obligations under this clause 11.**

## **12. Acknowledgement and publicity**

---

### **12.1. Acknowledgement of support**

**12.1.1.** Unless or until notified by Us, You must, in all publications, promotional and advertising materials, public announcements and activities by You or on Your behalf in relation to the Project, or any products, processes or inventions developed as a result of the Project, acknowledge the financial and other support You have received from Us, in the manner set out in item O of Schedule 1 or as otherwise approved by Us prior to its use.

**12.1.2.** You must ensure that all advertisements, promotional activities and any other public relations matters in relation to this agreement are consistent with the requirements set out in item O of Schedule 1 (if any).

### **12.2. Right to publicise Funding**

**12.2.1.** We reserve the right to publicise and report on the awarding of Funding to You, including the amount of the Funds given to You, Your name and the title and a description of the Project.

### **12.3. No restriction on advocacy**

**12.3.1.** For the avoidance of doubt, except to the extent that You are restricted or prevented from disclosing Our Confidential Information or Personal Information, no right or obligation in this agreement is to be read or understood as restricting or preventing Your rights to:

Our Initials: NLS

Your Initials: SY

- a. comment on;
- b. advocate support for; or
- c. oppose change to:

any matter established by law, policy or practice of the Commonwealth.

### **13. Dealing with Copies and Access to Documents**

---

#### **13.1. Interpretation**

13.1.1. In clause 13.2:

**Copy** means any document, device, article or medium in which Commonwealth Material or Our Confidential Information is embodied.

#### **13.2. Actions at end of agreement**

13.2.1. You will, on expiration or termination of this agreement, deal with all Copies as directed by Us, subject to any requirement of law binding on You.

#### **13.3. Access to documents**

13.3.1. This clause 13.3 applies if this agreement is a 'Commonwealth contract' as defined in the *Freedom of Information Act 1982* (Cth) and 'document' has the meaning given by that Act.

13.3.2. You agree that:

- a. Where We have received a request for access to a document created by, or in the possession of, You or any of Your subcontractors that relates to the performance of this agreement (and not to the entry into the agreement), We may at any time by written notice require You to provide the document to Us and You must, at no additional cost to Us, promptly comply with the notice; and
- b. You must assist Us in respect of Our obligations under the *Freedom of Information Act 1982* (Cth); and
- c. You must include in any subcontract relating to the performance of this agreement provisions that will enable You to comply with Your obligations under this clause 13.3.

### **14. Liability**

---

#### **14.1. Indemnity**

14.1.1. You indemnify Us from and against any:

- a. cost or liability incurred by Us;

Our initials: ADB

Your initials: SV

- b. loss or damage to Our property; or
  - c. loss or expense incurred by Us in dealing with any claim against Us including legal costs and expenses on a solicitor/own client basis and the cost of time spent, resources used or disbursements paid by Us,
- arising from either:
- d. a breach by You of this agreement; or
  - e. an act or omission involving fault on the part of You or Your Personnel in connection with this agreement;
  - f. use of the Assets; or
  - g. the use by Us of the Project Material, Existing Material or Third Party Material, including any claims by third parties about the ownership or right to use the Intellectual Property rights or Moral Rights in the Project Material, Existing Material or Third Party Material.

14.1.2. Your liability to indemnify Us under clause 14.1.1 will be reduced proportionately to the extent that any act or omission involving fault on the part of Us or Our Personnel contributed to the relevant cost, liability, loss, damage or expense.

14.1.3. Our right to be indemnified under this clause 14.1 is in addition to, and not exclusive of, any other right, power or remedy provided by law, but We are not entitled to be compensated in excess of the amount of the relevant cost, liability, loss, damage or expense.

14.1.4. In this clause 14.1 "fault" means any negligent or unlawful act or omission or wilful misconduct.

## **15. Dispute resolution**

### **15.1. Procedure for dispute resolution**

15.1.1. A dispute arising under this agreement will be dealt with as follows, and subject to clause 15.4 neither party will commence legal proceedings in relation to that dispute until this procedure is completed:

- a. the party claiming that there is a dispute will give the other party a notice setting out the nature of the dispute;
- b. within 5 Business Days (or such other period as agreed by the parties in writing) each party will nominate a representative not having any prior involvement in the dispute;
- c. the representatives will try to settle the dispute by direct negotiation between them;
- d. failing settlement within a further 10 Business Days, or such other period as agreed by the parties in writing (or failure of one or both parties to nominate a representative within the period set out in clause 15.1.1.b), the parties may agree to refer the dispute to an independent third person with power:

Our initials: NLD

Your initials: SL



- i. to intervene and direct some form of resolution, in which case the parties will be bound by that resolution; or
- ii. to mediate and recommend some form of non-binding resolution;
- e. the parties will co-operate fully with any process instigated under clause 15.1.1.d in order to achieve a speedy resolution; and
- f. if the parties have been unable to agree to refer the dispute to an independent third person, or they have agreed and a resolution is not reached within a further 20 Business Days (or such other period as the parties may agree in writing), either party may commence legal proceedings.

**15.2. Costs**

- 15.2.1. Each party must bear its own costs of complying with clause 15.1, and the parties must bear equally the cost of any third person engaged under clause 15.1.1.d.

**15.3. Continued performance**

- 15.3.1. Despite the existence of a dispute, You must (unless required in writing by Us not to do so) continue to perform Your obligations under this agreement.

**15.4. Exemption**

- 15.4.1. Clauses 15.1 and 15.2 do not apply:
  - a. to action by Us under or purportedly under clauses 3, 16.1 or 19.1;
  - b. to action by either party under or purportedly under clause 16.2;
  - c. where an agency or authority of the Commonwealth of Australia, a State or Territory is investigating a breach or suspected breach of the law by You; or
  - d. to legal proceedings by either party seeking urgent interlocutory relief.

**16. Termination or reduction in scope of Project**

---

**16.1. Termination or reduction with costs**

- 16.1.1. We may by notice, at any time and in Our absolute discretion, terminate this agreement or reduce the scope of the agreement immediately.
- 16.1.2. You must, on receipt of a notice of termination or reduction:
  - a. stop or reduce the performance of Your obligations as specified in the notice;
  - b. take all available steps to minimise loss resulting from that termination or reduction;
  - c. continue performing any part of the Project not affected by the notice; and
  - d. immediately return to Us any Funding in accordance with clause 16.1.3.d or deal with any such Funding as directed by Us.
- 16.1.3. In the event of termination or reduction in scope under clause 16.1.1, We will:

Our initials:   N/A  

Your initials:   S-2

- a. be liable only to pay Funding due and owing to You under the payment provisions of the agreement as at the date of the notice of termination; and
  - b. be liable to reimburse any reasonable costs You unavoidably incur relating directly and entirely to the Project and not covered under clause 16.1.3.a;
  - c. not be liable to pay amounts under clause 16.1.3.a and 16.1.3.b which would, added to any payments already paid to You under this agreement, together exceed the Funding set out in item 8 of Schedule 1; or
  - d. be entitled to recover from You any part of the Funding which:
    - i. has not been legally committed for expenditure by You in accordance with the agreement and payable by You as a current liability by the date that the notice of termination is received; or
    - ii. has not, in Our opinion been spent by You in accordance with the agreement.
- 16.1.4. In the event of a reduction in the scope of the agreement under clause 16.1.1, Our liability to pay any part of the Funding will, unless there is agreement in writing to the contrary, reduce in accordance with the reduction in the Project.
- 16.1.5. You will not be entitled to compensation for loss of prospective profits for a termination or reduction in scope under this clause 16 or loss of any benefits that would have been conferred on You.
- 16.1.6. Our liability to pay compensation under or in relation to clause 16.1 is subject to Your compliance with clause 16.1 and Your substantiation of any amount claimed under clause 16.1.3.b.
- 16.2. Termination for breach**
- 16.2.1. If a party is in breach of any of its obligations under this agreement, then the other party - if it considers that the breach is:
- a. not capable of remedy – may, by notice, terminate this agreement immediately; or
  - b. capable of remedy – may, by notice require that the breach be remedied within 10 Business Days of receiving the notice and, if the breach is not remedied within that time, may terminate this agreement immediately by giving a second notice.
- 16.2.2. We may also by notice terminate this agreement immediately (but without prejudice to any prior right of action or remedy which either party has or may have) if:
- a. You repeatedly fail to comply with any timeframe under this agreement;
  - b. We are satisfied that, prior to entering into this agreement, You engaged in misleading or deceptive conduct or omitted to provide information to Us in connection with the performance or awarding of this agreement;

Our initials: SLB  
 Your initials: SY

- c. You are unable to pay all Your debts when they become due, or are presumed to be insolvent, or if You are:
  - i. a corporation - come under any form of external administration, or receive a notice, or proceedings are commenced, to dissolve You or cancel Your Incorporation or registration, or to place You under any form of external administration;
  - ii. an individual - become bankrupt or enter into an arrangement under Part IX or Part X of the *Bankruptcy Act 1966* (Cth);
- d. in relation to the agreement, You breach any law of the Commonwealth, or of a State or Territory; or
- e. You cease to carry on a business relevant to the performance of the Project.

16.2.3. Where We terminate this agreement under clauses 16.2.1 or 16.2.2 We:

- a. will only be liable to pay Funding due and owing to You under the payment provisions of the agreement as at the date of notice of termination; and
- b. will be entitled to recover from You any part of the Funding which:
  - i. is not legally committed for expenditure by You in accordance with the agreement and payable by You by the date that the notice of termination is received; or
  - ii. has not, in Our opinion, been spent by You in accordance with the agreement.

### 16.3. Preservation of other rights

16.3.2. Clause 16.2 does not limit or exclude any of Our other rights under this agreement.

## 17. Notices

---

### 17.1. Format, addressing and delivery

17.1.1. A notice under this agreement is only effective if it is in writing, and dealt with as follows:

- a. *if given by You to Us*- addressed to the Project Officer at the address specified in item P of Schedule 1 or as otherwise notified by Us; or
- b. *if given by Us to You* - given by the Project Officer (or any superior officer to the Project Officer) and addressed (and marked for attention) as specified in item Q of Schedule 1 or as otherwise notified by You.

17.1.2. A notice is to be:

- a. signed by the person giving the notice and delivered by hand; or
- b. signed by the person giving the notice and sent by pre-paid post; or
- c. transmitted electronically by the person giving the notice by electronic mail or facsimile transmission.

Our initials: AKD

Your initials: SH

**17.2. When received**

- 17.2.1. A notice is taken to have been received:
- a. *if delivered by hand* – upon delivery to the relevant address;
  - b. *if sent by pre-paid post* - 5 Business Days after the date of posting to the relevant address; or
  - c. *if transmitted electronically* – at the time that would be the time of receipt under the *Electronic Transactions Act 1999* if a notice was being given under a law of the Commonwealth.
- 17.2.2. A notice received after 5.00 pm, or on a day that is not a Business Day in the place of receipt, is deemed to be received on the next Business Day in that place.

**18. Corporate Governance**

---

**18.1. Constitution**

- 18.1.1. If You are a body corporate, You warrant that Your constitution is not inconsistent with this agreement.
- 18.1.2. You must notify Us If You intend to amend Your constitution in a way which affects Your ability to comply with this agreement.
- 18.1.3. If You amend Your constitution in a way which affects Your ability to comply with this agreement, We may terminate this agreement under clause 16.2.

**18.2. Notification**

- 18.2.1. You must notify Us within 5 Business Days of the occurrence of any of the events specified in clause 16.2.2.

**18.3. Management**

- 18.3.1. Unless otherwise agreed by Us in writing at Our sole discretion, You must not employ, engage or elect any person who would have a role in Your management, financial administration, or if notified by Us the performance of the Project if:
- a. the person is an undischarged bankrupt;
  - b. there is in operation a composition, deed of arrangement or deed of assignment with the person's creditors under the law relating to bankruptcy;
  - c. the person has suffered final judgment for a debt and the judgment has not been satisfied; or
  - d. subject to Part VIIC of the *Crimes Act 1914* (Cth), the person has been convicted of any offence within the meaning of paragraph 85ZM(1) of that Act unless:
    - i. that conviction is regarded as spent under paragraph 85ZM(2) (taking into consideration the application of Division 4 of Part VIIC);
    - ii. the person was granted a free and absolute pardon because the person was wrongly convicted of the offence; or

Our Initials: NAB

Your Initials: SY

- iii. the person's conviction for the offence has been quashed.

**19. General provisions**

---

**19.1. Audit and access**

- 19.1.1. You must at all reasonable times give any employee of Us on production of photo Identification, or any person authorised in writing by Us:
  - a. reasonable access to:
    - i. Your employees and equipment;
    - ii. premises occupied by You;
    - iii. Material; and
  - b. Reasonable assistance to:
    - i. inspect the performance of the Project;
    - ii. locate and inspect Material;
    - iii. make copies of Material and remove those copies, relevant to the Project.
- 19.1.2. The rights referred to in clause 19.1.1 are subject to:
  - a. the provision of reasonable prior notice to You; and
  - b. Your reasonable security procedures.
- 19.1.3. If a matter is being investigated which, in Our opinion or in the opinion of any person authorised in writing by Us, may involve an actual or apprehended breach of the law, clause 19.1.2.a will not apply.
- 19.1.4. The requirement for access specified in clause 19.1.1 does not in any way reduce Your responsibility to perform Your obligations under this agreement.
- 19.1.5. A breach of Your obligations under clause 19.1.1 is, for the purposes of clause 16.2 [Termination for breach], a breach which is not capable of remedy.

**NOTE: There are additional rights of access under the Ombudsman Act 1976 (Cth), the Privacy Act, and the Auditor-General Act 1997 (Cth).**

**19.2. Insurance**

- 19.2.1. You must:
  - a. effect and maintain the insurance specified in item R of Schedule 1; and
  - b. within 10 Business Days of a request by Us, provide proof of insurance acceptable to Us.
- 19.2.2. This clause 19.2 continues in operation for so long as any obligations remain in connection with this agreement.

Our Initials: NLS

Your Initials: CSB

**19.3. Extension of provisions to subcontractors and Personnel**

19.3.1. In this clause 19.3:

**Requirement** means an obligation, condition, restriction or prohibition binding on You under this agreement.

19.3.2. You must ensure that:

- a. Your subcontractors and Personnel comply with all relevant Requirements; and
- b. any contract entered into in connection with this agreement imposes all relevant Requirements on the other party.

19.3.3. You must exercise any rights You may have against any of Your subcontractors, Personnel or third parties in connection with a Requirement in accordance with any direction by Us.

**19.4. Conflict of interest**

19.4.1. In this clause 19.4:

**Conflict** means any matter, circumstance, interest, or activity affecting You, Your Personnel or subcontractors which may or may appear to Impair Your ability to perform the Project diligently and independently.

19.4.2. You warrant that, to the best of Your knowledge after making diligent inquiry, at the Date of this Agreement no Conflict exists or is likely to arise in the performance of the Project.

19.4.3. If, during the period of this agreement a Conflict arises, or appears likely to arise, You must:

- a. notify Us immediately;
- b. make full disclosure of all relevant information relating to the Conflict; and
- c. take any steps We reasonably require to resolve or otherwise deal with the Conflict.

19.4.4. If You fail to notify Us under clause 19.4.3, or are unable or unwilling to resolve or deal with the Conflict as required, We may terminate this agreement under clause 16.2 [Termination for breach].

**19.5. Relationship of parties**

19.5.1. You are not by virtue of this agreement an officer, employee, partner or agent of Ours, nor do You have any power or authority to bind or represent Us.

19.5.2. You must not:

- a. misrepresent Your relationship with Us; or
- b. engage in any misleading or deceptive conduct in relation to the Project.

Our initials:   JH  

Your initials:   SP

- 19.5.3. You must ensure that Your officers, employees, partners and agents do not represent themselves as being an officer, employee, partner or agent of Ours.

**19.6. Waiver**

- 19.6.1. A failure or delay by a party to exercise any right or remedy it holds under this agreement or at law does not operate as a waiver of that right.
- 19.6.2. A single or partial exercise by a party of any right or remedy it holds under this agreement or at law does not prevent the party from exercising the right again or to the extent it has not fully exercised the right.

**19.7. Variation**

- 19.7.1. A variation of this agreement is binding only if agreed in writing and signed by the parties.

**19.8. Assignment and Novation**

- 19.8.1. You cannot assign Your obligations, and must not assign Your rights, under this agreement without Our prior written approval.
- 19.8.2. You must not negotiate with any other person to enter into an arrangement that will require novation of Your rights or obligations under this agreement without first consulting Us.

**19.9. Survival**

- 19.9.1. Unless the contrary intention appears, the expiry or earlier termination of this agreement will not affect the continued operation of any provision relating to:
- a. repayments;
  - b. reporting;
  - c. licensing of Intellectual Property;
  - d. confidentiality;
  - e. security;
  - f. privacy;
  - g. dealing with copies;
  - h. Records;
  - i. audit and access;
  - j. an indemnity;
  - k. acknowledgement and publicity;
  - l. rights or obligations following termination or expiry of the agreement;
- or any other provision which expressly or by implication from its nature is intended to continue.

Our initials: NCIA

Your initials: SP

**19.10. Compliance with Laws and Our Policies**

19.10.1. You must, in carrying out Your obligations under this agreement, comply with:

- a. any relevant statutes, regulations, by-laws and requirements of any Commonwealth, State, Territory or local authority; and
- b. any of Our policies notified by Us to You in writing,  
including those listed in Item 5 of Schedule 1.

**19.11. Applicable law**

19.11.1. This agreement is to be construed in accordance with, and any matter related to it is to be governed by, the law of the Australian Capital Territory.

19.11.2. The parties submit to the non-exclusive jurisdiction of the courts of the Australian Capital Territory.

Our initials: MLL

Your initials: Sox



## SCHEDULE 1. AGREEMENT DETAILS

### A. Programme and Project

(see clause 2.1.2.a)

#### A.1. Programme, Objectives and Guidelines

##### Programme name:

Online National Assessment Platform

##### Objectives of Programme:

Australian education ministers are committed to reforming national assessment by moving assessment online, with a focus on the National Assessment Program – Literacy and Numeracy (NAPLAN). Moving national assessments online will have significant educational benefits for Australian students including:

- faster turnaround of results.
- enhanced diagnostic value of the NAPLAN test through provision of adaptive testing which enables better support for students at the upper and lower ends of the performance scale.
- increased accessibility of the NAPLAN test to students with additional learning needs.

A platform is required that has the capability to deliver a range of assessments online including:

- NAPLAN.
- national sample assessments, with the National Assessment Program – Civics and Citizenship in October 2016 to be conducted online using the platform.
- as the basis for broader systemic and classroom assessments.

##### Programme Guidelines:

We are funding You to develop the online national assessment platform ('the Platform') as Our contribution to the overall programme of work to transition to national online assessment. You must work with the Australian Curriculum, Assessment and Reporting Authority (ACARA) to ensure that the Platform delivers the national assessment program online, as well as having the potential to deliver systemic and classroom based assessment items in the future. Development of the Platform will be overseen by various working groups established by the Council of Australian Governments (COAG) Education Council.

Our initials: ad/ls

Your initials: 87

## **A.2. Project**

- A2.1 The Project consists of the development of the Platform to deliver online assessments, including NAPLAN and national sample assessments and which has the potential to deliver systemic and classroom assessments in the future.
- A2.2 You must ensure that the Platform has a multi-tenant capability and can successfully integrate with the external systems of partner and stakeholder agencies for the successful exchange of data, including ACARA, state/territory education departments and test administration authorities (organisations with responsibility for the implementation and administration of National Assessment Program (NAP) tests in their jurisdiction).
- A2.3 You must ensure that the Platform incorporates:
- a. an assessment creation and management system which enables creation and management of items and tests and their related workflows;
  - b. an assessment delivery system for the management of the entire test delivery lifecycle. This system must enable delivery of tests to students and manage the logistics of assigning students to tests and assigning invigilators to test sessions. It must include an offline delivery management system to allow for assessments to be conducted in low bandwidth and no bandwidth environments. In addition it must also include components for providing reports and data extracts related to assessment events conducted within the assessment delivery system.
  - c. an assessment marking system (implemented as a sub system of the assessment delivery system) that includes the capability for automated scoring of responses to questions assigned to be automatically scored, in addition to human scoring. It must also include the capability to integrate with an external automated essay scoring system.
  - d. a longitudinal data store that works as a data warehouse for storing assessment responses, assessment results and any other assessment related data that might be required at the end of an assessment event. The longitudinal data store must be able to store this data for multiple assessment events and multiple years so as to enable longitudinal reporting. The longitudinal data store must also be able to provide this data in the appropriate format to external agencies for analysing and reporting using their own tools.
  - e. a registration and access system for creating users, storing identifiers and ensuring correct user access to various components.
  - f. system services administration to provide a common interface for all system administration and management tasks. These include database management, archiving, cloud data storage and tenancy management;
  - g. capability to link to content in existing learning repositories and applications such as Australian Curriculum, Scootle and any other content sources; and
  - h. an interoperability solution for all systems, including integrating with external systems such as school, jurisdiction, national, test administration authorities and other agencies to provide or receive data such as student results.

- A2.4 You must ensure that the Platform meets the specifications and requirements provided in Attachment A *Business Requirements Specification* and Attachment B *Solution Architecture*.
- A2.5 You must ensure that the Platform complies with the following Australian Government policies and guidelines, as amended from time to time:
- a. Australian Government Interoperability Framework ([www.finance.gov.au/policy-guides-procurement/interoperability-frameworks](http://www.finance.gov.au/policy-guides-procurement/interoperability-frameworks)).
  - b. Australian Government Architecture principles ([www.finance.gov.au/policy-guides-procurement/australian-government-architecture-aga](http://www.finance.gov.au/policy-guides-procurement/australian-government-architecture-aga)).
  - c. Australian Government Cloud Computing Policy (<http://www.finance.gov.au/cloud>).
  - d. Australian Government Cyber Security Strategy ([www.ag.gov.au/RightsAndProtections/CyberSecurity/Pages/default.aspx](http://www.ag.gov.au/RightsAndProtections/CyberSecurity/Pages/default.aspx))
  - e. Australian Government Protective Security Policy Framework (PSPF) ([www.protectivesecurity.gov.au](http://www.protectivesecurity.gov.au))
  - f. Australian Government Information Security Manual (ISM) ([www.asd.gov.au/infosec/ism](http://www.asd.gov.au/infosec/ism))
- A2.6 You must ensure that the Platform can deliver the national assessment program online, including NAPLAN and the national sample assessments for civics and citizenship, science literacy, and information and communication technology (ICT) literacy. The Platform must be ready to deliver the NAP Civics and Citizenship national sample assessment in October 2016 and NAPLAN in May 2017.
- A2.7 You must work with, and obtain advice from, ACARA in meeting Your obligations under this Item A.2, and in particular Item A.2.6
- A2.8 You must ensure that the Platform meets Our security requirements. This includes:
- a. Ensuring that those of Your employees, and subcontractors who are to perform work in relation to the Project, comply with Our protective security policies and procedures;
  - b. Ensuring that all of Your employees or subcontractors who perform the Project:
    - i. are of good fame and character;
    - ii. are properly qualified for the tasks they are to perform;
    - iii. have been screened at the notified level as outlined in *Australian Standard AS:4811-2006: Employment Screening*; and
    - iv. will act in all circumstances in a fit and proper manner while they are carrying out work under this contract.
  - c. When utilising outsourced ICT services (including 'cloud') hosting environments, you must ensure that data and records:

Our Initials: ALB

Your initials: SR

- i. must not be stored or processed in any 'offshore' data hosting centre (cloud) environment; and
  - ii. must be stored and processed in an onshore 'Private' data hosting centre (cloud) environment.
- d. Where You engage a 'cloud' service provider for the delivery of any component of the Platform, Infrastructure as a Service (IaaS), Software as a Service (SaaS) and/or Platform as a Service (PaaS) providers must have successfully undergone and received Australia Signals Directorate (ASD) Infosec Registered Assessor Program (IRAP) certification
- e. Where You engage an IaaS service provider You will remain responsible for the management and control over the application stack in all environments used such as: Production, Pre-Production, Development, Test and Staging
- f. You are responsible for arranging and paying for independent third party security penetration testing of all infrastructure and application components of the Platform. The testing will occur prior to the Platform being launched and at each major release.
- g. The penetration testing reports must be forwarded to Us for review and consideration
- h. You must obtain prior written permission from Us to move the Platform to a production environment. Permission is dependent on the findings of the penetration test
- i. We may undertake, at any time, with prior notice to You, a passive vulnerability assessment of components of the Platform, in a pre-production or lower environment
- j. We may at our discretion and cost, with prior notice to You, undertake passive penetration testing of the production environment.
- k. Where vulnerability, penetration or other security testing identifies application vulnerabilities, remediation will follow these guidelines
  - i. Critical vulnerabilities – must be addressed by an emergency release;
  - ii. High and medium vulnerabilities – must be addressed in the next release; and
  - iii. Low risk vulnerabilities – must be addressed at next application Major Release

**A2.9** The Project includes hosting, maintenance and support of the Improve formative assessment tool from 1 July 2015 up to and including 30 June 2016. You will also investigate integrating Improve into the Platform during this time for Our consideration. You must continue providing Us monthly usage reports regarding Improve as already arranged, as well as including general updates regarding Improve within the three monthly progress Reports for the Project.

Our Initials: N/A  
 Your Initials: Suz

### A.3 Milestones:

A3.1 You must complete the following milestones by the dates listed below:

Milestone	Date
1 Implementation Plan approved by Us.	30 April 2015
2 Planning phase completed, including: <ul style="list-style-type: none"><li>• Vendor procurement.</li><li>• Staff on-boarding.</li><li>• Security and tenancy design.</li><li>• Component integration planning.</li><li>• Completion of Plans as outlined at item A.6.1 of this schedule.</li></ul>	30 June 2015
3 Stage 1 platform development completed, including: <ul style="list-style-type: none"><li>• Technical readiness tool.</li><li>• Assessment creation and management system.</li><li>• Assessment delivery system.</li><li>• Assessment marking system.</li><li>• Assessment event reporting.</li><li>• Online delivery and presentation.</li><li>• Completion of Other Plans as outlined at item A.6.2 of this schedule</li></ul>	1 December 2015
4 Stage 2 platform development completed, Including: <ul style="list-style-type: none"><li>• System services administration.</li><li>• Student registration and management</li><li>• Integrated automated essay scoring system</li><li>• Component integration.</li><li>• Tenancies completed.</li><li>• Capacity to enable offline and low bandwidth options.</li></ul>	1 April 2016
5 Platform testing completed, including: <ul style="list-style-type: none"><li>• Training and user documentation development</li><li>• Internal system regression testing.</li><li>• Security penetration testing.</li><li>• Load testing.</li><li>• National user acceptance testing.</li><li>• Accessibility testing.</li><li>• Sandbox environment available.</li></ul>	1 July 2016
6 Delivery on the Platform of NAP Civics and Citizenship online.	October 2016
7 Stage 3 platform development completed, including: <ul style="list-style-type: none"><li>• Longitudinal data store</li></ul>	March 2017
8 Delivery on the Platform of NAPLAN online.	May 2017

Our Initials: NLS

Your initials: dy

**A.4 Project Material:**

If requested by Us, You must provide a copy of any Project Material to Us in the form specified by Us.

**A.5 Implementation Plan**

A5.1 By 24 April 2015, You must provide Us a detailed draft Implementation Plan for the project. You must ensure that the draft Implementation Plan details at a minimum:

- a. how You will deliver the Project, including meeting the specifications and requirements provided in the *Business Requirements Specification* (Attachment A) and *Solution Architecture* (Attachment B);
- b. each activity (Project activity) You will undertake to deliver the Project and each Project Milestone;
- c. a clear description of all tasks associated with each Project activity;
- d. a detailed timeline with start and finish dates for each Project activity;
- e. procurement plans and details of proposed subcontracting;
- f. a risk management plan and risk register;
- g. internal staffing and governance arrangements;
- h. a stakeholder engagement strategy;
- i. a detailed breakdown of each item in the Budget in item C of this Schedule; and
- j. consultation and information sharing arrangements with ACARA.

A5.2 You must consult with ACARA and the National Schools Interoperability Program (NSIP) steering group to develop the draft Implementation Plan.

A5.3 Upon receipt of Your draft Implementation Plan, We may at Our option:

- a. approve the draft Implementation Plan, in which case We will notify You in writing of that approval; or
- b. require You to amend the draft Implementation Plan, and submit a revised draft Implementation Plan to Us, in which case this item A.5.3 will apply to that revised draft Implementation Plan.

A5.4 The approved Implementation Plan will form part of the agreement and You must deliver the Project in accordance with the approved Implementation Plan.

A5.5 The parties to this agreement may agree, in writing, to vary the approved Implementation Plan

**A.6 Other Plans**

A6.1 You must submit by 30 June 2015 the following draft plans related to development of the Platform for Our approval:

Our initials: ND

Your initials: S

- a. An updated Security Risk Management Plan and System Security Plan (SRMP and SSP) using the Department of Education and Training template and requirements;
- b. Component Integration plan;
- c. Resource Plan;
- d. Tenancy Management Plan;
- e. Master Test Plan;
- f. Stakeholder Engagement and Communication Plan;

A6.2 You must submit by 1 December 2015 the following draft plans related to development of the Platform for Our approval:

- a. Privacy Impact Assessment;
- b. Disaster Recovery Plan;
- c. Business Continuity Plan;
- d. Incident response plan, including direction for data breach handling;
- e. Data Sanitisation Plan;
- f. Hosting Plan;
- g. System Maintenance Plans;
- h. Accessibility plan; and
- i. Helpdesk plan.

A6.2 Upon receipt of these Plans, We may at Our option:

- a. approve the draft Plans, in which case We will notify You in writing of that approval; or
- b. require You to amend the draft Plans, and submit revised draft Plans to Us, in which case this item A.6.2 will apply to the revised draft Plans.

#### **A.7 Project Period**

The Project Period commences on the Date of this Agreement and ends on 30 June 2017

### **B. Funding and Payment**

(see clauses 6.2.1.c)

#### **B.1. Funding**

B1.1 The Funding for the Project is \$22,755,644.26 GST inclusive (\$20,686,949.33 GST exclusive) made up of the following amounts:

- a) existing Funding of \$4,094,877.60 GST inclusive (\$3,722,616.00 GST exclusive) (already held by You that was unexpended under the Previous Agreement and which We have directed will be used for the purposes of this agreement, see Item B.2); and
- b) new Funding of \$18,660,766.66 GST inclusive (\$16,964,333.33 GST exclusive)

Our initials: ADB

Your initials: SWP

B1.2 An additional amount of Funding of up to \$4,523,933.34 GST inclusive (\$4,112,666.67 GST exclusive) may be available, at Our absolute discretion, in accordance with item B.3 for unanticipated costs in the delivery of the Project post 1 July 2016.

B1.3 The new Funding will be paid as follows:

Payment number	Timing for payment	GST inclusive amount	GST exclusive amount
First payment	On Your completion to Our satisfaction of Milestone 1	\$1,118,700.00	\$1,017,000.00
Second payment	On Your completion to Our satisfaction of Milestone 2.	\$10,824,000.00	\$9,840,000.00
Third payment	On Your completion to Our satisfaction of Milestones 3, 4, 5, 6 and 7	\$6,718,066.66	\$6,107,333.33
Total		\$18,660,766.66	\$16,964,333.33

B.1.4 Each payment of Funds is subject to:

- You having completed the part of the Project (including any Milestone) that is a condition of the payment to the satisfaction of Us;
- Whether We have exercised Our rights under clause 3.6.1 of the agreement;
- You having provided all Reports that were due on or prior to the payment date; and
- Where a taxable supply is made, You having provided a correct and complete tax Invoice to Us as set out below, or where no taxable supply is made, You providing an Invoice to Us.

## B.2 Existing Funding

B2.1 You agree that existing Funding totalling \$4,094,877.60 GST inclusive (\$3,722,616.00 GST exclusive) is already held by You and was provided under the funding agreement between Us and You with regard to the National Assessment and Surveys Online Program dated 27 June 2012 and terminated by mutual consent on 27th April 2015 ("the Previous Agreement").

Our Initials: ALH

Your Initials: [Signature]



- B2.2 As a condition of the mutual termination of the Previous Agreement, it was agreed that the existing Funding must be used, and would form part of the Funding, for the Project.
- B2.3 For the avoidance of doubt, You must treat the existing Funding as if it was Funding provided under this agreement and must only use the existing Funding in accordance with this agreement.

### **B.3 Contingency amount**

- B.3.1 An additional amount of up to \$4,523,933.34 GST inclusive (\$4,112,666.67 GST exclusive) may be available, at Our absolute discretion, in accordance with this item B.3 for unanticipated costs in the delivery of the Project.
- B.3.2 We may, at Our absolute discretion, pay You an amount or amounts not exceeding \$4,523,933.34 GST inclusive (\$4,112,666.67 GST exclusive) in total at any time until the end of the Project Period for unanticipated costs in the delivery of the Project.
- B.3.3 We will not exercise Our discretion under item B.3.2 if We consider that You can meet the unanticipated costs using the Funding or if We are not satisfied that there are unanticipated costs in the delivery of the Project.
- B.3.4 If We pay You an amount under item B.3.2 then that amount forms part of the Funding under this agreement and We may impose such conditions on Your use of that Funding as We require in addition to Your obligations under this agreement.
- B.3.5 Prior to Us considering whether to exercise Our discretion under item B.3.2, You must provide Us a business case detailing, at a minimum:
- a. the additional amount requested;
  - b. details of the unanticipated costs in the delivery of the Project post 1 July 2016;
  - c. detailed expenditure statement of the Funding, including anticipated expenditure of the Funding;
  - d. an itemised budget for Your use of the requested additional amount; and
  - e. an implementation plan for Your use of the requested additional amount in the delivery of the Project.
- B.3.6 We may request that You amend Your business case submitted under item B.3.5, and upon You receiving such request You must submit an amended business case.

### **B.4 INVOICES**

Invoices must include the following information:

- a. the words "tax invoice" stated prominently;
- b. Your name and ABN;
- c. Our name and address;

Our Initials: AKH

Your Initials: SG

- d. the date of issue of the tax invoice;
- e. the title of this agreement/the Project and the agreement number (if any) or date of execution;
- f. details of the items (ie. deliverables or Milestones) to which they relate;
- g. the total amount payable (including GST);
- h. the GST amount shown separately; and
- i. bank account details for the payment of the invoice by electronic funds transfer.

An invoice is not correctly rendered where:

- a. It Includes amounts that are not properly payable under this agreement or are incorrectly calculated; or
- b. it relates to a payment in relation to which We have exercised Our rights under clause 3.6.1 of the agreement .

All invoices must be addressed to the Project Officer.

## **B.5 PAYMENT**

Subject to the terms of this agreement, We will make a payment of Funds to You within 20 Business Days of the conditions in this item B being satisfied.

Payment will be effected by electronic funds transfer (EFT) to Your following bank account

BSB: 083-004

Account : 139329337

Account Name: Education Services Australia

## **B.6 BANK ACCOUNT**

You are required to comply with clause 3.4.1.b. and establish a separate bank account for the Funds.

Our Initials: ABD

Your Initials: Soy

**C. Budget**

(see clause 3)

**Budget**

Expenditure item	Total GST inclusive	Total GST exclusive
------------------	---------------------	---------------------

This item has been redacted. It provides information on values of activities subject to current procurement processes which could potentially limit the Australian Government's ability to achieve the best value for money.

**Budget flexibility**

See Clause 3.3.2

**D. Project Officer**

(see clause 1.1.1)

The Project Officer is the person for the time-being holding, occupying or performing the duties of Director, Online Assessment Team, currently Tim Kinder, available on telephone number 02 6240 9296 or via the address set out in Item P of Schedule 1.

**E. Subcontractors**

(see clause 5.1.3)

**F. Specified Personnel**

(see clause 5)

The following Specified Personnel (either named Personnel or the specific skills that are required, or both) are required to undertake the activities set out below:

Our initials: ADH

Your initials: SV

Skills Required	Name, if applicable	Details of Work
Programme Control Board member	Susan Mann	Overall Project direction, decision making and accountability.
Project manager	Nick Weideman	Project management, staff and sub-contractor management.
Security manager	To be identified	Security manager for the Platform. Expected to act as the point of contact between Us and You, and on behalf of any subcontractors hired by You

#### G. Assets

(see clause 6)

##### Asset Register

You must maintain an Asset register in the following form and containing the following information:

Asset number	Description of Asset	Creation, acquisition or total lease cost	Date of creation, acquisition or total lease	Term of lease or other arrangement	Location of Asset	Method of, and date, which Asset was written off or disposed of

#### H. Review

(see clause 7.2)

You must take part in the final evaluation of the Programme, as directed by Us, at the time and in the manner specified by Us.

Our initials: RLH  
Your initials: SH

## **I. Reporting**

(see clause 8)

### **I.1 Alternative time for provision of audits (clause 8.1.2)**

Not applicable

### **I.2 Details to be contained in statements (clause 8.1.5.a.)**

Not applicable

### **I.3 Alternative time for provision of statements (clause 8.1.5.c.)**

Not applicable

### **I.4 Reports to be provided (clause 8.1.1)**

#### **Progress Reports**

You must provide Us with progress Reports as follows:

<b>Report</b>	<b>Reporting period</b>	<b>Report due</b>
1st progress Report	From signing of agreement to 30 June 2015	10 July 2015
2nd progress Report	1 July to 30 September 2015	16 October 2015
3rd progress Report	1 October to 31 December 2015	15 January 2016
4th progress Report	1 January 2016 to 31 March 2016	15 April 2016
5th progress Report	1 April to 30 June 2016	15 July 2016
6th progress Report	1 July to 30 September 2016	14 October 2016
7th progress Report	1 October to 31 December 2016	13 January 2017
8th progress Report	1 January to 31 March 2017	14 April 2017

Progress Reports must contain the following information at a minimum:

- a description and analysis of the progress of the Project during the reporting period;
- a discussion and analysis of whether the timeframes and Milestones are being met and an explanation of any delays and action proposed to address the delays, and the expected effects (if any) on the Project and its completion;
- information regarding whether the Project is proceeding within Budget, and if not, an explanation of why and the action being taken or proposed to address this;
- a statement of the Funding received to date and the amount spent, and the amount remaining;

Our Initials: N/A

Your Initials: SA

- e. an updated risk register and detailed information on any changes to risk ratings;
- f. list of consultations and stakeholder engagements;
- g. as an appendix, detailed reports on the outcomes of key events such as security threat assessments, accessibility testing, load testing, user acceptance testing, NAP Civics and Citizenship trial and other such events; and
- h. any other information that We reasonably require.

#### **Annual Report**

You must provide Us with annual Reports for each 12 month period in which You receive or use a payment of Funding, except the year in which the final Report is to be provided pursuant to item l, as follows:

Report	Reporting period	Report due
1st annual Report	1 January 2015 to 31 December 2015	31 January 2016
2nd annual Report	1 January 2015 to 31 December 2016	31 January 2017

Each annual Report must contain the following information at a minimum:

- a summary of the key activities and achievements during the previous 12 month period;
- an analysis of any major issues that have affected the Project over the previous 12 months, including action taken to address these;
- an overview of the major activities still to be completed and any issues affecting these;
- a financial statement regarding expenditure during the previous 12 months, bank interest earned, and explanation of any discrepancies between actual and planned expenditure; and
- any other information that We reasonably require.

#### **Final Report**

You must provide Us with a final Report as follows:

The final Report is for the period from signing of the agreement up to and including 30 June 2017. The final report is due on 31 July 2017. The final Report must contain the following information:

- a. a summary of the Project objectives;
- b. an evaluation of whether the Project met its objectives, including any issues which arose during the course of the project, how these were addressed, and any future recommendations;
- c. a detailed analysis of the system performance and any issues encountered during the delivery of NAPLAN online in 2017;
- d. a financial statement outlining final project expenditure; and
- e. any other information that We reasonably require.

#### **Other Reports**

Our initials: NAB

Your initials: Sof

You must provide ad hoc reports in relation to the Project as notified by Us including to any body authorised by Us to receive project reports.

**J. Commonwealth Material**

---

(see clause 9.1)

Not applicable

**K. Existing Material**

---

(see clause 1.1.1 & 9.2.2)

Existing material includes the *Improve* online formative assessment tool and its content developed by You with funding from Us. See <https://www.improve.edu.au>

**L. Moral Rights**

---

(see clause 9.3)

Permitted Acts

In addition to those set out in clause 9.3.1, the following are 'Permitted Acts' for the purposes of clause 9.3.1.e:

- a. use of the Project Material for advertising, merchandising or promotional purposes of any kind;
- b. incorporating the Project Material into a website or as part of a multi-media training program;

**M. Confidential Information**

---

(see clause 10.1.1)

None specified

**N. Privacy Conditions, Restrictions or Guidelines**

---

(see clause 11.2.1.b)

In this item N:

**Information Commissioner** has the same meaning as it has in section 3A of the *Australian Information Commissioner Act 2010* (Cth).

**Records** has the same meaning as it has in section 6 of the Privacy Act.

In relation to Personal Information received, created or held by You for the purposes of this agreement, You agree:

Our initials:   N/A  

Your initials:   [Signature]

- (a) not to transfer Personal Information outside Australia, or to allow parties outside Australia to have access to it, without the prior written approval of the Project Officer;
- (b) to co-operate with reasonable demands or inquiries made by the Information Commissioner or the Project Officer in relation to the management of Personal Information;
- (c) to ensure that any person who You allow to access Personal Information is made aware of, and undertakes in writing, to observe the Australian Privacy Principles;
- (d) to comply with policy guidelines laid down by the Us or issued by the Information Commissioner from time to time relating to the handling of Personal Information;
- (e) if requested by Us, at the end of this agreement, to return all Records containing Personal Information to the Project Officer, or delete or destroy those Records in the presence of a person authorised by the Project Officer;
- (f) to Your name being published in reports by the Information Commissioner; and

You must immediately notify the Project Officer if You become aware:

- (a) of a breach of Your obligations under clause 11;
- (b) that a disclosure of Personal Information may be required by law; or
- (c) of an approach to You by the Information Commissioner or by a person claiming that their privacy has been interfered with.

Note: more information about the Privacy Act, the Information Privacy Principles and the Australian Privacy Principles is available at <http://www.oaic.gov.au/>

## **O. Acknowledgement and Publicity**

(see clause 12)

Manner of acknowledgement:

This project is supported by the Australian Government Department of Education and Training.

Requirements for advertisements and other public relations matters:

This project is supported by the Australian Government Department of Education and Training.

## **P. Our Address for Notices**

(see clause 17.1.1.a)

Physical address	50 Marcus Clarke St, Canberra City ACT 2600
Postal address	GPO Box 9880, Canberra City ACT 2601
Email	tim.kinder@education.gov.au

Our initials: NH

Your initials: ST



**Q. Your Address for Notices**

(see clause 17.1.2.b)

Physical address	Level 4, 440 Collins St, Melbourne VIC, 3000
Postal address	PO Box 177, Carlton South VIC 3053
Email	susan.mann@esa.edu.au

**R. Insurance**

(see clause 19.2)

Required insurance:

You must maintain:

- a. workers' compensation as required by law;
- b. public liability insurance to a value of \$10 million (ten million dollars) or more per claim.

**S. Compliance with Laws and Policies**

(see clause 19.10.1)

**S.1 Compliance with Laws**

You acknowledge that:

- (a) You may have obligations under the *Workplace Gender Equality Act 2012* and You must comply with those obligations;
- (b) when dealing with Your employees, You must comply with the *Fair Work Act 2009* (Cth) and related legislation, and obligations under relevant work health and safety laws;
- (c) Chapter 7 of the *Criminal Code* provides for offences which attract substantial penalties, including theft of Commonwealth property and other property offences, obtaining property or financial advantage by deception, offences involving fraudulent conduct, bribery, forgery and falsification of documents;
- (d) giving false or misleading information is a serious offence under the *Criminal Code*;
- (e) the publication or communication of any fact or document by a person which has come to their knowledge or into their possession or custody by virtue of the performance of this agreement (other than a person to whom You are authorised to publish or disclose that fact or document) may be an offence under section 70 of the *Crimes Act 1914*, punishment for which may be a maximum of two years imprisonment;

Our initials: NAB

Your initials: SM

- (f) in respect of data, including personal information, held in connection with this agreement, any unauthorised and intentional access, destruction, alteration, addition or impediment to access or usefulness of the data stored in any computer in the course of performing this agreement is an offence under Part 10.7 of the *Criminal Code* which may attract a substantial penalty, including imprisonment;
- (g) You are aware of the provisions of section 79 of the *Crimes Act 1914* (Cth) relating to official secrets; and
- (h) You may be subject to the provisions of the *Competition and Consumer Act 2010* (Cth) and the *Archives Act 1983* (Cth).

## S.2 Compliance with policies

You must:

- (a) when using Our premises or facilities (including information systems), comply with Our directions and procedures relating to environmental management, work health, safety and security (which you acknowledge may change during the Term);
- (b) ensure that any person who will have access to official secrets within the meaning of section 79 of the *Crimes Act 1914* (Cth) sign an acknowledgment that he or she is aware of the provisions of that section.

## S.3 Reserved

## S.4 Reserved

## S.5 Cybersafety

- a) The Commonwealth's cybersafety policy is that where an organisation is funded by the Commonwealth to carry out a Project using computers and/or other digital technology, the safety of Clients when using those computers and/or other digital technology must be assured.
- b) You must take Reasonable Steps to protect Your Clients' cybersafety.
- c) If We give You notice, You must provide Us, within 10 Business Days of receiving the notice in accordance with 17.2.1, with evidence satisfactory to Us that You have complied with the requirements of this cybersafety policy.
- d) You agree to include Your obligations in relation to this cybersafety policy in all subcontracts You enter into in relation to the Project or part of the Project.
- e) For the purposes of this cybersafety policy:

'Clients' means persons who may use Your computers and/ or other digital technology that is supported through public funding provided pursuant to this agreement and includes but is not limited You, Your staff and the public, whether they be adults or children.

'Reasonable Steps' means having in place strategies to minimise and manage risks of exposure to inappropriate or harmful on-line content by users of computers, and particularly children, and may include but is not limited to having a policy in place regarding appropriate use and protection for Clients, installation of filters, audits and provision of information or training to Your staff regarding the risks of, and protection from,

Our Initials: AD

Your Initials: Scf

Inappropriate or harmful on-line content.

S.6      Reserved

S.7      Working with Children Requirements

- a. In this agreement, unless the contrary intention appears
- 'AFP'** means the Australian Federal Police;
- 'Contact with Children'** means substantial contact with an individual or substantial contact with a group, (whether that contact is supervised or not) where the individual, or at least one member of the group, is under the age of 18 years, and includes both physical and non-physical contact, including over the internet, via telephone, or any other form of communication;
- 'National Police Check for Working with Children'** means a national criminal history check undertaken by the AFP or by a State police force where the check is undertaken specifically in relation to working with children;
- 'Teacher'** means a person who is a teacher in a school and who is involved in working on the Project because they are a teacher teaching in a school.
- b. You must ensure that any individual (other than a Teacher) who is working on the Project for You or on Your behalf and who will have Contact with Children undergoes a National Police Check for Working with Children. In addition, You must comply with relevant State/Territory legislation requiring screening for persons who work with children.
- c. Where a National Police Check for Working with Children has been obtained in relation to an individual prior to their being a requirement for that individual to undergo a National Police Check for Working with Children in accordance with this agreement, that previous National Police Check for Working with Children may be used for the purposes of this agreement provided that:
- i. it is no more than 12 months old;
- ii. it has been obtained for the purpose of establishing suitability for a position working with children (eg in relation to a State/Territory based check or as part of an employer's requirements); and
- iii. the individual in question consents to You disclosing to Us the information contained in the National Police Check for Working with Children.
- d. National Police Checks for Working with Children must be completed prior to individuals coming into Contact with Children. The cost of obtaining relevant National Police Checks for Working with Children is to be borne by You.
- e. You must provide to Us an original or, if provided by a State/Territory authority which holds the original a certified true copy of any National Police Check for Working with Children which shows a conviction registered or charge pending in relation to an individual. The suitability of such individuals to participate in the Project will be determined by Us. You must not allow an individual whose National Police Check for

Our initials:   *AB*  

Your initials:   *DP*

**Working with Children reveals a conviction or charge pending to have Contact with Children in relation to the Project without written authorisation from Us.**

- f. Records of all National Police Checks for Working with Children must be maintained and all documentation must be made available and accessible for viewing by Us in accordance with clause 19.1 of this agreement.
- g. You must ensure that any person who undergoes a National Police Check for Working with Children in accordance with the requirements of this agreement is informed in writing that the results of that National Police Check for Working with Children may be passed on to Us for the purposes of assessing whether We will consent to the person having Contact with Children in connection with the Project.
- h. You are also required to comply with relevant State/Territory legislation requiring screening for persons who work with children. Note that the requirement for all individuals to undergo a National Police Check for Working with Children is in addition to any other checks undertaken in compliance with State/Territory working with children legislation.
- i. National Police Checks for Working with Children must be undertaken by each person who will be working with children every 2 years from the date of issue of the first National Police Check for Working with Children obtained in relation to that person.
- j. You must immediately notify Us if any individual who has had Contact with Children in the course of working on the Project is charged with or found guilty of an indictable offence.
- k. You must immediately notify Us if an individual who has had Contact with Children in the course of working on the Project is the subject of an allegation relating to:
  - i. violence against children;
  - ii. any sexual offence;
  - iii. any offence involving pornography; or
  - iv. any offence involving the trafficking or dealing of illegal drugs.
- l. We will make a decision as to whether an individual who is the subject of a notification in accordance with paragraph j. or k. of this Item 5.7 can continue to have Contact with Children. The individual in question must not have Contact with Children in connection with the Project while a decision from Us is pending.
- m. Prior to engaging or allowing individuals to have Contact with Children, You must obtain the consent of those individuals to the provision to Us of the information mentioned at paragraph j. or k. of this item 5.7, should the situation arise.

**5.8      Reserved**

Our initials: ABH

Your initials: SeJ

## **S.9 Web Accessibility**

### ***Interpretation***

9.1. In this clause S9,

- a. **Five Conformance Requirements** means the five conformance requirements of WCAG 2.0 available at <http://www.w3.org/TR/WCAG20/#conformance-reqs>
- b. **NTS** means the Web Accessibility National Transition Strategy (available at <http://www.finance.gov.au/publications/wcag-2-implementation/>);
- c. **Sufficient Techniques** means the Sufficient (and avoidance of Failure) Techniques available via either WCAG 2.0 Techniques or WCAG 2.0 Quick Reference; and
- d. **WCAG 2.0** means the Web Content Accessibility Guidelines version 2.0 (available at <http://www.w3.org/TR/WCAG20/>).

### ***Web accessibility requirements for the Project***

9.2. In undertaking the Project, You must ensure that any website, content, applications and services You develop that are within the scope of the NTS conform to WCAG 2.0 at Level AA.

9.3. For the purposes of 9.2:

- 1. Your claims of conformance must comply with the Five Conformance Requirements; and
- 2. You are required to demonstrate WCAG 2.0 at Level AA conformance, through the use of Sufficient Techniques.

Our initials:   *HL*  

Your initials:   *SP*

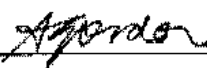
This agreement is made on 29th April

2015

Signatures

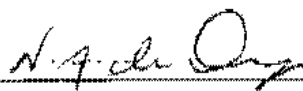
SIGNED for and on behalf of the  
Commonwealth of Australia as  
represented by the Department of  
Education and Training by: )  
)  
)

Alexandra Gordon  
Name of signatory

  
Signature

In the presence of:

Nicole den Duyn  
Name of witness

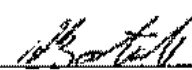
  
Signature of witness

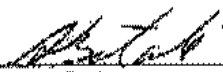
SIGNED for and on behalf of Education  
Services Australia Limited, ABN 18 007  
342 421 by its Authorised Officers:

Susan Mann  
Name of Authorised Officer

  
Signature of Authorised Officer

In the presence of:

 (Anna Bartoli)  
Name of witness

  
Signature of witness

and by

SHARON O'NEILL  
Name of Authorised officer

  
Signature of Authorised Officer

In the presence of:

KAREN EGGLETT  
Name of witness

  
Signature of witness



## **Assessment Platform**

### **Assessment Delivery System Business Requirements**

Prepared by Education Services Australia

Version 1.16

January 2015

# Contents

<b>1</b>	<b>Overview.....</b>	<b>3</b>
1.1	Project background.....	3
1.2	Business objectives.....	3
1.3	Document purpose.....	4
<b>2</b>	<b>Business processes in scope.....</b>	<b>5</b>
2.1	The model.....	5
2.2	Listing.....	5
2.3	Conceptual system diagram.....	6
2.4	Stakeholders.....	8
<b>3</b>	<b>Business requirements.....</b>	<b>9</b>
3.1	User Management.....	9
3.2	TD3 – Construct test.....	10
3.2.1	Business process diagram.....	10
3.2.2	Business requirements.....	10
3.3	PTA2 – Readiness for test at the local level.....	13
3.3.1	Business process diagram.....	13
3.3.2	Business requirements.....	14
3.3.3	Technical readiness tool.....	15
3.4	PTA3 – Register for test.....	18
3.4.1	Business process diagram.....	18
3.4.2	Business requirements.....	18
3.5	TA1 – Deliver test.....	21
3.5.1	Business process diagram.....	21
3.5.2	Business requirements.....	21
3.5.3	Offline delivery.....	26
3.6	TA2 – Apply tailored test design.....	28
3.6.1	Business process diagram.....	28
3.6.2	Business requirements.....	29
3.7	PTTA1 – Conduct post-test administration.....	30
3.7.1	Business process diagram.....	30
3.7.2	Business requirements.....	30
3.8	Mark and score tests.....	32
3.8.1	Business process diagram.....	32
3.8.2	Business requirements.....	32
3.9	Analysis and reporting.....	38
3.10	AR1- Conduct central analysis of data.....	37
3.10.1	Business process diagram.....	37
3.10.2	Business requirements.....	37
3.11	AR2- Provide school and jurisdiction summary data and reports.....	39
3.11.1	Business process diagram.....	39
3.11.2	Business requirements.....	39



3.12	AR3- Generate student performance estimates .....	41
3.12.1	Business process diagram .....	41
3.12.2	Business requirements .....	41
3.13	AR4- Provide student report and data to jurisdictions and schools .....	42
3.13.1	Business process diagram .....	42
3.13.2	Business requirements .....	42
3.14	AR5- Generate student performance data for national reporting .....	43
3.14.1	Business process diagram .....	44
3.14.2	Business requirements .....	44
3.15	AR7- Provide national report and outcome data to responsible authorities .....	45
3.15.1	Business process diagram .....	45
3.15.2	Business requirements .....	45
3.16	Non-functional requirements .....	46
3.16.1	Tenancy management .....	46
3.16.2	Accessibility .....	46
3.16.3	Usability .....	47
3.16.4	Interoperability .....	47
3.16.5	System performance .....	48
3.16.6	System availability .....	48
3.16.7	Maintainability .....	49
3.16.8	Data storage .....	49
3.16.9	Scalability .....	50
3.16.10	Volumetrics .....	50
3.16.11	Deployment and hosting .....	50
3.16.12	Security and privacy .....	51
3.16.13	Help desk and service standards .....	53
3.16.14	Audit and control .....	54
3.16.15	Legal and corporate .....	55
4	<b>Supporting documents .....</b>	<b>55</b>
5	<b>Appendices .....</b>	<b>56</b>
5.1	Appendix A – Timeframe parameters .....	56
5.2	Appendix B – Performance levels .....	57
5.3	Appendix C – Assessment delivery system process flow .....	60
5.4	Appendix D – Stakeholder diagram .....	61
5.5	Appendix E - Glossary .....	63

# 1 Overview

## 1.1 Project background

The Australian Government Department of Education is funding Education Services Australia (ESA) to provide develop the Online National Assessment Platform ('the Assessment Platform') as part of a broader program of work that supports a range of assessment types including national online assessment.

The vendor will provide an assessment delivery system to support a range of assessment types including but not limited to the National Assessment Program (NAP), and in particular, the NAP of sample assessments in science literacy, civics and citizenship and information and communication technology and the National Assessment Program for Literacy and Numeracy (NAPLAN), related trialling and research assessments.

The Assessment Platform may also deliver a range of jurisdictional assessment programs and systemic and classroom-based assessments in the future to enable a broader use of the platform.

ESA is responsible for supplying the information technology systems to deliver assessment tests and surveys online. ESA is responsible for the delivery of the technical services for the Assessment Platform.

One of the components of the Assessment Platform is an online-based assessment delivery system. This system will allow for test creation and management using an existing item authoring system, user management and student registration, test administration, delivery, access and presentation of tests to eligible students, as well as scoring of these assessments as well as reporting for assessment events. Offline and low-bandwidth delivery solutions are also included as part of the overall assessment delivery system.

ESA is managing the procurement process for the assessment delivery system, and invites tenders for the licensing of an assessment delivery system and provision of services, namely the design, development and delivery, hosting and maintenance of the assessment delivery system, in addition to training and level 3 helpdesk support. ESA may, in its sole and absolute discretion, invite any preferred respondent to enter into a contract for the provision of the services.

## 1.2 Business objectives

In order to support a national online assessment solution, several business objectives emerge. These objectives are centred on the development of:

- user management and student registration
- test creation and management
- test registration
- test administration
- online assessment delivery and presentation
- offline and low-bandwidth delivery and presentation
- automatic scoring and manual marking
- reporting of assessment events and operations
- technical readiness tool
- landing pages for registration, login, technical readiness, test entry and administration.

Other components of the Assessment Platform which will require integration with the assessment delivery system include:

- item authoring and review
- external student registration and management system
- automated essay scoring system
- longitudinal reporting, analytics and data warehouse.

## 1.3 Document purpose

The purpose of this document is to articulate the high-level business requirements to support the NAP online business processes. The processes depicted in this document are specific to NAPLAN but the requirements are indicative of all the NAP online assessments.

When reading this document please note the following:

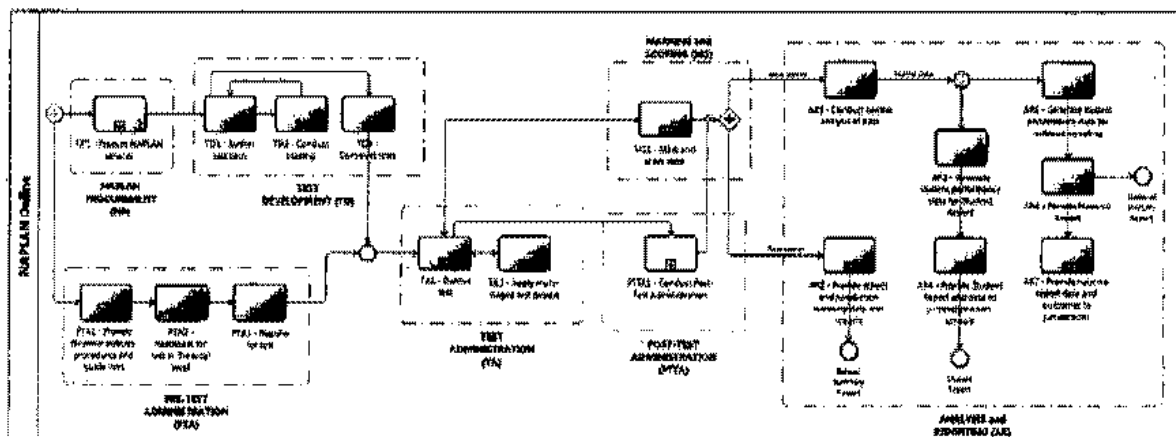
- While the business process diagrams provide valuable context, the written requirements are to be regarded as the authoritative definition of how the system needs to function
- Activities coloured 'white' are manually performed outside of the Assessment Platform.
- Activities coloured 'yellow' are performed in systems outside of the Assessment Platform.
- Activities coloured 'blue' are performed within and supported by the Assessment Platform.
- The conceptual level of the stages for NAP online is coloured for presentations only to distinguish between the stages.
- The requirements and assumptions are presented at the highest level of the business process, rather than at every sub-process level.
- Only those processes which contain sub-processes that rely on the Assessment Platform are included.
- Prioritisation is based on business value and dependencies and have the following values:

## 2 Business processes in scope

This section is used to provide a summary of the key NAP online conceptual stages.

### 2.1 The model

The following draft model provides an overview diagram of the business processes represented within this document.



Note: While the business process diagrams provide valuable context the written requirements are to be regarded as the authoritative definition of how the system needs to function.

### 2.2 Listing

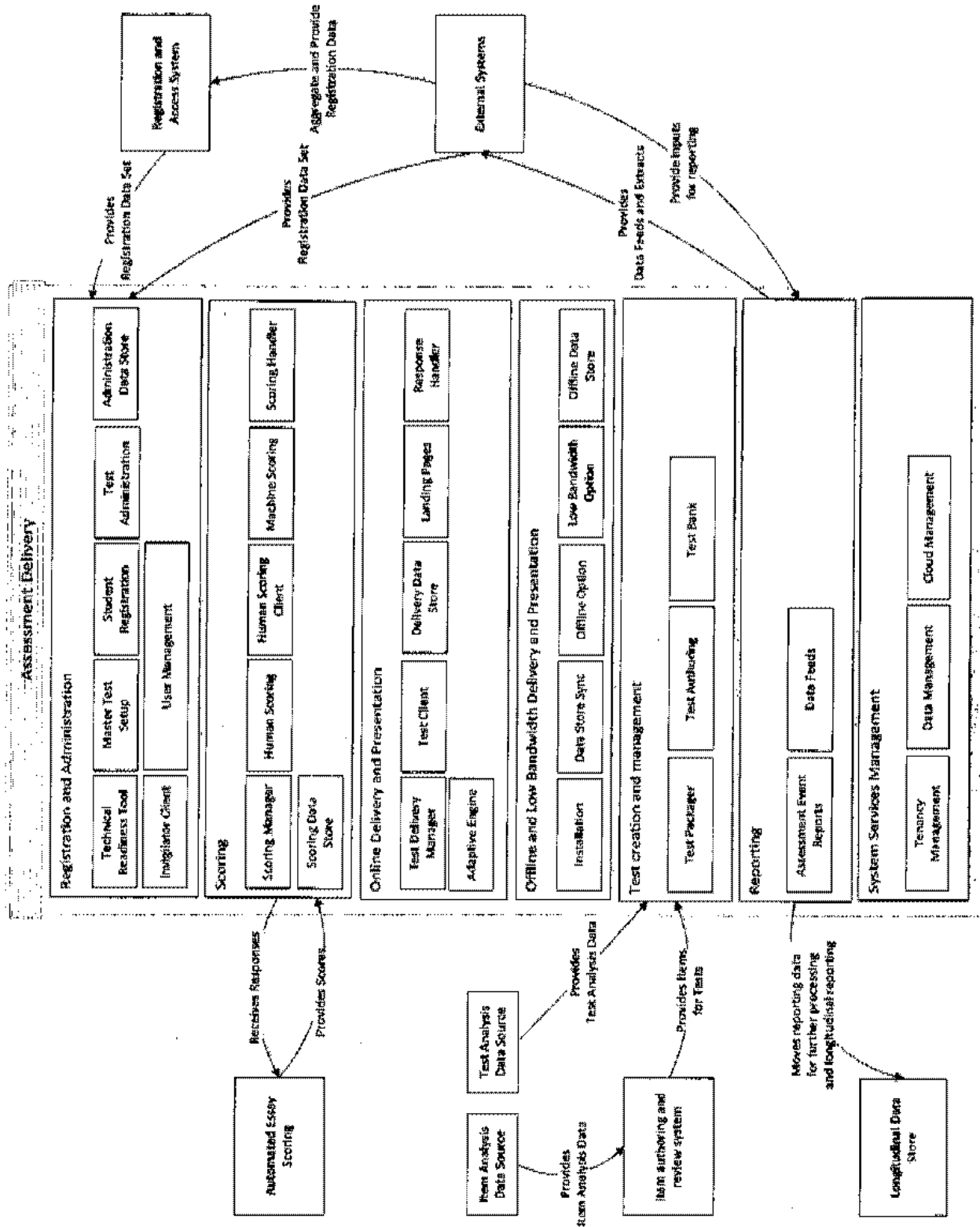
The following listing provides a summary of the business processes represented within this document. Where the business process relies on the Assessment Platform in delivering stated business requirements, the applicable requirements are stated in Section 3 – Business Requirements. If there is no reliance on the system the business process is marked N/A. Each conceptual stage is further detailed in Section 3.

Business Process Reference	Business Process Title	Applicable Requirements
<b>NAP ONLINE – All Stages</b>		
Generic business requirements have been identified in relation to all NAP Online conceptual stages as per 2.1 – The Model.		
<b>User Management (UMG)</b> These are system requirements for user management and do not belong to any specific business process.		UMG-01 to UMG-37
<b>Test Development (TD)</b> Test item authoring and ingestion, trialling and testlet, fixed test and NAP main test construction and review.		
TD1	Author Test Item	Test item authoring requirements are not in the scope of this document
TD2	Conduct trialling	There are no separate requirements for trialling as these are covered under the main requirements

TD3	Construct test	TD3-01 to TD3-49
<b>Pre-test Administration (PTA)</b> Preparing for the NAP testing at the national, jurisdictional and school levels, including registration and timetabling.		
PTA1	Provide national policies, procedures and guidelines	N/A
PTA2	Readiness for test at the local level	PTA2-01 to PTA2-03
PTA3	Register for test	PTA3-01 to PTA3-25
<b>Test Administration (TA)</b> The administration process employed during the NAP testing cycle by the schools, jurisdictions and national bodies.		
TA1	Deliver tests	TA1-01 to TA1-71 OFF-01 to OFF-51
TA2	Apply NAP multi-staged test design	TA2-01 to TA2-14
<b>Post-Test Administration (PTTA)</b> The post-test administration process employed during the NAP testing cycle by the schools, jurisdictions and national bodies to ensure all required testing and quality information is available within the system.		
PTTA1	Conduct post-test administration	PTTA1-01 to PTTA1-13
<b>Marking and Scoring (MS)</b> The marking and scoring of the NAP test responses, including release of the marked and scored data to analysis and reporting.		
MS1	Mark and score tests	MS1-01 to MS1-38
<b>Analysis and Reporting (AR)</b> Analysis and reporting activities at the national, jurisdictional and school-level, including student performance and national reporting.		
Generic	Analysis and reporting	ARG-01 to ARG-20
AR1	Conduct central analysis of data	AR1-01 to AR1-08
AR2	Provide school and jurisdiction summary data and reports	AR2-01 to AR2-15
AR3	Generate student performance data for student report	AR3-01 to AR3-03
AR4	Provide student report and data to jurisdictions and schools	AR4-01 to AR4-15
AR5	Generate student performance data for national report	AR5-01 to AR5-05
AR6	Provide national report	N/A
AR7	Provide national report data and outcomes to jurisdictions	AR7-01 to AR7-02

## 2.3 Conceptual system diagram

The following diagram provides conceptual overview of the logical segregation of systems in the NAP online project.



## 2.4 Stakeholders

Listed below are the key stakeholder groups within the NAP business processes:

Stakeholder	Description
Australian Government Department of Education	Project Sponsor
Australian Curriculum, Assessment and Reporting Authority (ACARA)	An independent authority responsible for the development of a national curriculum, a national assessment program and a national data collection and reporting program that supports 21 <sup>st</sup> century learning for Australian students.
Jurisdictions	There are eight (8) state and territory government systems across Australia as per the relevant Letters of Patent and the Commonwealth of Australia Constitution Act. Test Administration Authorities (TAAs) are responsible for the implementation and administration of the NAP tests in their jurisdiction (eg New South Wales, Northern Territory, Tasmania etc).
Responsible authorities	The jurisdictional authority, school system authorities (government, Catholic and independent), aggregations of schools and the individual school within the boundaries of a state or territory.
School – Principals	The educator who has executive authority for a school.
School – Teachers	The qualified and registered educator who delivers an educational program, assesses student participation in an educational program, and/or administers or provides consistent and substantial leadership to an educational program.
School – Students	Students are persons who are undertaking primary or secondary education and attending school morning and afternoon five days each week.
School – Parents and/or Carers	A person or persons recognised as the legal guardians of an enrolled student.
Expert reviewers	Those persons who are acknowledged within the education industry as holding expert knowledge within their field of learning.
External experts	Those persons who are engaged by ACARA to contribute writing prompts.
Service providers	Contractors that have been engaged by ACARA to supply services across the NAP online business processes, including test item development, marking and scoring and data analysis and reporting.
Education Services Australia (ESA)	A national, not-for-profit company owned by all Australian education ministers, established to support delivery of national priorities and initiatives in the schools, training and higher education sectors.
Education Council	Formerly known as Standing Council on School Education and Early Childhood (SCSEEC), the Education Council provides a forum through which strategic policy on school education and early childhood development can be coordinated at the national level, and through which, information can be shared and resources used collaboratively towards the achievement of agreed objectives and priorities.

### 3 Business requirements

This section provides further information on the business processes contained within section 2.2 Listing.

#### 3.1 User Management

The following user management requirements have been identified:

Requirement ID	Requirement Description	Priority
UMG-01	The system shall associate a unique identifier to each and every user.	M
UMG-02	The system shall authorise ACARA users to manage NAP Online service provider, reviewer, approver, marker user accounts and authorisations.	M
UMG-03	The system shall allow an authorised user to create and manage users and roles.	M
UMG-04	The system shall allow an authorised user to assign roles to a user.	M
UMG-05	The system shall allow an authorised user to assign permissions to a role.	M
UMG-06	The system shall maintain links between all supplied student identifiers.	M
UMG-07	The system shall maintain the link between student identifiers and demographic information.	M
UMG-08	The system shall accurately maintain the link of the student to the school; the school to the jurisdiction and the school to a responsible authority.	M
UMG-09	The system shall validate all users that attempt to login into the system.	M
UMG-10	The system shall provide the ability to associate multiple assessments with a single unique and persistent assessment platform student identifier.	M
UMG-11	The system shall require a user to sign-in only once per session to perform more than one role.	M
UMG-12	The system shall return the student to the place s/he was working when logging back into the system (eg in case of a disruption).	M
UMG-13	The system shall return an authorised user to a dashboard/central page when logging back into the system.	M
UMG-14	The system shall have the ability to create one time student access codes on a per test event basis.	M
UMG-15	The system shall provide the ability for users to log in with their login credentials.	M
UMG-16	The system shall provide the ability for authorised users to reset login credentials for a user.	M
UMG-17	The system shall provide the ability to force a user to change their password on first log in.	M
UMG-18	The system shall have the ability to be provisioned by and integrate with an external identity provider.	M
UMG-19	The system shall provide an administration interface (delegated model) for schools, school authorities, jurisdictions, agencies and governance bodies to manage passwords, roles and update other information for which they have authority.	M
UMG-20	The system shall support the end-to-end lifecycle for all user data (eg teachers, staff) including registration, suspension, archiving and removal.	M
UMG-21	The system shall allow authorised users to set or change their own password.	M
UMG-22	The system shall enable manual updates of user data by an authorised user.	M
UMG-23	The system shall enable an authorised user to update a user's individual accessibility preferences and demographic data.	M
UMG-24	The system shall enable a school/school authority/jurisdiction administrator to add predefined additional external identifiers, after registration, to allow reporting across systems and assessment types, within the scope of that administrator's school/school authority/jurisdiction.	M

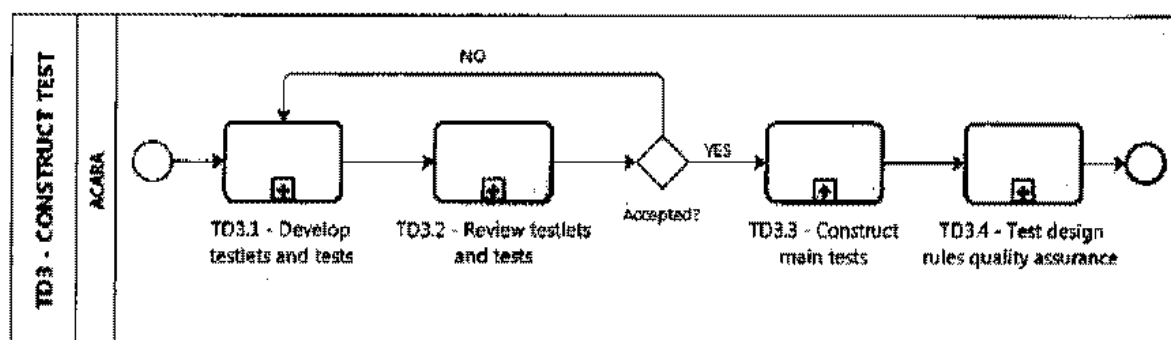


UMG-25	The system shall allow authorised users that are already authenticated to their local school, jurisdiction or agency portal to access the system without needing to sign in again (ie federated single sign-on).	D
UMG-26	The system shall be capable of generating reports on all users and the roles they hold.	M
UMG-27	The system shall be able to generate reports on all objects in the system, including users, classes, schools, sectors, and organisations.	M
UMG-28	The system shall allow the creation of users in bulk from a CSV file supplied in an agreed upon format.	M
UMG-29	The system shall allow the registration and management of users.	M
UMG-30	The system shall allow a user to self-register via a secure link in their local portal.	D
UMG-31	The system shall allow an authorised user to email a secure registration link to a new user for self-registration.	M
UMG-32	The system shall allow school and organisation information to be bulk loaded and maintained manually from file uploads in agreed formats.	M
UMG-33	The system shall allow schools and organisations to be manually registered and maintained in the system.	M
UMG-34	The system shall maintain the relationship data about students and their school, school authority and jurisdiction.	M
UMG-35	The system shall maintain the relationships of staff member to organisational unit and organisation.	M
UMG-36	The system shall maintain the relationships between organisational units, organisations, schools, school authorities and jurisdictions.	M
UMG-37	The system shall maintain the relationships between classes and schools.	M

## 3.2 TD3 – Construct test

This business process includes those activities required for the construction of testlets (used within tailored, multi-stage test design of the main test) and fixed tests (those not included within the tailored, multi-stage test design, eg writing prompt) used within the main test.

### 3.2.1 Business process diagram



### 3.2.2 Business requirements

Business Requirements	
ID	TD3
Name	Construct Tests

<b>Actors</b>	ACARA – Test Managers ACARA – Psychometricians Expert Reviewers Item Authoring & Review System (IARS) System – Test Development
<b>Preconditions</b>	<ol style="list-style-type: none"> <li>1. The actors are correctly set up within the system.</li> <li>2. The actors have received their unique sign-on to the system.</li> <li>3. The psychometric information from trialling has been captured against the test items.</li> <li>4. The NAP test specifications are defined and the test templates are available within the system.</li> <li>5. The approved test items are available for use and accessible from the item bank.</li> </ol>
<b>Post Conditions</b>	<ol style="list-style-type: none"> <li>1. Actors have performed all their authorised activities within the TD3 – Test Construction business process.</li> <li>2. The NAP main tests are securely stored in the test bank.</li> </ol>
<b>Assumptions</b>	<ol style="list-style-type: none"> <li>1. That the system will be able to simultaneously administer differing versions of the NAP main test (up to 10 as per the tailored, multi-staged test design) to students for a given domain and year level.</li> <li>2. That ACARA will continue to have the final review and outcome decision.</li> </ol>

Requirement ID	Requirement Description	Priority
TD3-01	The system shall provide the capability for creation, review and management of multiple tests across all stages of the test development business process.	M
TD3-02	The system shall provide the capability to develop testlets and tests which support the tailored, multi-staged test design process (TA2 – Apply Tailored Test Design) and the branching rules.	M
TD3-03	The system shall provide the capability for a testlet to be shared between different tests and/or test branches without duplication. Note: It means that the testlet B that appears in test pathway ABC is the same as the one that appears in pathway ABE. Changes to the testlet are reflected in all relevant pathways. So each testlet needs to be uniquely identified.	M
TD3-04	The system shall provide capability for a test item to be included in multiple testlets and test pathways without duplication ie each item is uniquely identified.	M
TD3-05	The system shall provide the capability to create test templates and use them during the construction of testlets, fixed tests and the main test. Note: The test templates will enable different presentation styles.	M
TD3-06	The system shall provide the ability to version tests and create duplicate tests by copying an existing test.	M
TD3-07	The system shall allow the authorised users to add, create, update and/or retire (mark as obsolete) a testlet, fixed test, main test and/or sets of testlets.	M
TD3-08	The system shall provide the capability to the authorised users to create, update and delete metadata to testlets, fixed tests and/or main tests.	M
TD3-09	The system shall capture the required metadata with the testlets, fixed tests and/or main tests. See Section 4 – Supporting Documents for detailed listing.	M
TD3-10	The system shall provide version control to any and all created and existing testlets, fixed tests and/or main tests regardless of the status.	M
TD3-11	The system shall track the testlets, fixed tests and/or main tests in various statuses and any comments made by authorised users as it progresses through the review and approval process.	M

TD3-12	The system shall provide the capability for authorised users to search and/or browse for, sort and filter by any testlet, fixed test and/or main test metadata field. This includes all kind of associated metadata like custom attributes etc. but not limited to standard metadata only.	M
TD3-13	The system shall provide the capability for authorised users to search across multiple criteria with an ability to create custom queries by selecting from a list of criteria.	M
TD3-14	The system shall provide audit history for all modifications made to testlets, fixed tests and main test.	M
TD3-15	The system shall provide the capability to assign test items (individual and multiple) that have been approved in the Item Authoring & Review system (IARS) to testlets and fixed tests.	M
TD3-16	The system shall provide the capability to assign testlets and fixed tests to a main test.	M
TD3-17	The system shall make the approved tests available for test delivery.	M
TD3-18	The system shall associate a unique identifier to each and every testlet, fixed test and main test.	M
TD3-19	The system shall provide the capability to import and export the required metadata with the testlets, fixed tests and/or main tests.	M
TD3-20	To assist in functions like selecting an item to include/exclude from a testlet, the system shall display a single view of the item and all its associated information such as metadata, psychometric data etc.	M
TD3-21	The system shall provide the capability to preview a testlet or test just as it would appear in the test delivery.	M
TD3-22	The test item bank shall provide the capability to import defined technologically enhanced items in addition to the QTI defined item types.	M
TD3-23	The system shall provide the capability for authorised users to review a testlet, fixed test, main test and/or sets of testlets using a workflow which is similar to the way items are reviewed in the IARS.	M
TD3-24	The system shall provide the capability to present test items in different layouts.	M
TD3-25	The system shall have the ability to attach a file to a fixed test, testlet or main test.	M
TD3-26	The system shall provide the ability for an authorised user to restrict the display of metadata based on user roles.	M
TD3-27	The system shall provide the ability to make a copy of one or more tests including all associated content and assign a unique identifier to the new entries.	M
TD3-28	The system shall be able to support an authorised user to share one or more fixed tests, testlets or a main test including all associated content with other authorised system users.	M
TD3-29	The system shall allow changes in items to be reflected across the test bank in bulk in a controlled manner.	D
TD3-30	The system shall be able to bulk change the metadata fields of tests/testlets in the test bank.	D
TD3-31	The system shall notify the authorised users of different events during test creation and approval workflow.	M
TD3-32	The system shall be able to associate specific business rules, workflows and notifications to the flag status assigned to fixed tests, testlets or main tests.	M
TD3-33	The system shall provide the ability to flag an assessment ready for delivery.	M
TD3-34	The system shall provide the ability to move finalised and packaged tests to a test bank component.	M
TD3-35	The system shall enable multiple test packages and all associated content to be imported from external third-party repositories via agreed technical standards.	M

TD3-36	The system shall assign a unique identifier to each testlet sequence for multi-stage branching assessments.	M
TD3-37	The system shall provide the ability to review the testlet sequence for multi-stage branching assessments.	M
TD3-38	The system shall provide the ability to officially sign off the testlet sequence for multi-stage branching assessments.	M
TD3-39	The system shall provide an authorised user the ability to select or replace an item and/or testlet sequence assigned to an assessment.	M
TD3-40	The system shall provide the ability to search for item and testlet sequence for multi-stage branching assessments.	M
TD3-41	The system shall provide the capability to create sequential and non-sequential tests and testlets. Note: Sequential tests are those tests where students have to answer each question in the sequence the questions are presented. They cannot skip questions and cannot go back to previous questions to modify their response.	M
TD3-42	The system shall provide the capability to create sequential groups of items in a test.	M
TD3-43	The system shall allow an item or group of items to be configured within a test or testlet to restrict the student from editing previous responses after the student has progressed to the next item.	M
TD3-44	The system shall allow an item or group of items to be configured within a test or testlet to restrict the student from accessing the item until the student has responded to or viewed previous items in the sequence.	M
TD3-45	The system shall provide the capability to constitute a test as combination of more than one timed sections or more than one timed testlet.	M
TD3-46	The system shall provide the ability to create survey type testlet that is not marked. A survey testlet presents multiple multi-choice questions, ExtendedText and drop-down on one screen.	M
TD3-47	The system shall have the ability to ingest test items and associated content including metadata from the Item Authoring and Review system Note: The IARS system is based on QTI 2.1 technical standards.	M
TD3-48	The system shall provide the capability for the authorised ACARA users to create and update the tailored, multi-stage test design rules.	M
TD3-49	The system shall ingest the test design rules for NAP's tailored, multi-branching test design.	M

### 3.3 PTA2 – Readiness for test at the local level

The activities carried out by the responsible authority – school, diocese, education department or other authorised organisations or aggregations – to ready their organisation, staff and students for a NAP testing cycle.

Some of these readiness activities may be performed using Technical Readiness Tool (TRT) and/or Capacity Planning Tool (CPT) to assess school's readiness.

#### 3.3.1 Business process diagram



<b>Assumptions</b>	<ol style="list-style-type: none"> <li>1. That ACARA continues to specify readiness criteria.</li> <li>2. That the jurisdictions will continue to localise and implement the national procedures and guidelines for their local context.</li> <li>3. That there are criteria defined and available to enable schools to evaluate their readiness for NAP online, including ICT infrastructure.</li> <li>4. That participating school staff have sufficient computer access, knowledge and experience to administer the NAP tests.</li> <li>5. That participating students have sufficient computer access, knowledge and experience to undertake the NAP tests.</li> <li>6. That participating students and NAP assigned staff have had access to the system to familiarise themselves within standard functions, including accessibility options.</li> <li>7. That participating schools can provide online access to parents to view the student's NAP reports.</li> </ol>
--------------------	--

Requirement ID	Requirement Description	Priority
PTA2-01	The system shall provide the capability for students and staff to familiarise themselves with basic operations in the weeks prior to the NAP testing beginning.	M
PTA2-02	The system shall provide the capability for schools to assess their ICT (technical and capacity) readiness in the weeks prior to the NAP testing beginning. Note: requirements are mentioned in the technical readiness tool section below.	M
PTA2-03	The system shall provide the capability for schools to access the NAP pre-test administration information, ie URLs to websites and PDFs.	M

### 3.3.3 Technical readiness tool

The system shall provide a technical readiness tool which can be used by the schools, jurisdictions and responsible authorities to determine if they are ready to conduct NAP online assessments. The requirements for this tool are listed below:

Requirement ID	Requirement Description	Priority
<b>User Registration</b>		
TRT-01	The system shall provide a user registration and management capability.	M
TRT-02	The system shall provide the capability to authenticate users.	M
<b>Session Planning</b>		
TRT-03	The system shall provide the ability for authorised users to provide input such as but not limited to: <ul style="list-style-type: none"> <li>- number of students who need to take test for each year level</li> <li>- number of devices available in the school</li> <li>- number of rooms available</li> <li>- number of devices available in each room</li> <li>- the time available to complete an assessment.</li> </ul>	M
TRT-04	The system shall estimate, record and display an output advising how many sessions are required for the school to complete the NAP assessment based on the input provided by authorised users.	M
TRT-05	The system shall record and display a list of reasons where schools are unable to conduct an assessment. eg School does not have sufficient number of rooms. You need two extra rooms. School does not have sufficient number of machines. You need 10 more machines.	M

<b>Network Readiness [Do once, from any machine on the network]</b>		
TRT-06	<p>The system shall provide an authorised user the ability to input network load parameters to simulate an environment similar to the real time assessment environment. The system shall capture information such as but not limited to:</p> <ul style="list-style-type: none"> <li>- number of devices that will be used concurrently during the test.</li> <li>- number of wired devices and wireless devices</li> <li>- internet connection speed</li> <li>- internal network bandwidth</li> <li>- number of standard / high definition wireless access points</li> <li>- ratio of wireless devices to wireless access points</li> <li>- number of devices which are on school network but won't be used</li> <li>- known scheduled network load times or peak activities.</li> </ul>	M
TRT-07	The system shall calculate and display values such as network bandwidth.	M
TRT-08	The system shall allow an authorised user to add and comment on any of the captured values.	M
TRT-09	The system shall save all the input parameters entered by an authorised user or calculated by the system for retrieval any time later.	M
TRT-10	<p>Where the system identifies that the school network is not ready to conduct an assessment, it shall record and display a list of reasons.</p> <p>eg Network bandwidth is not sufficient. Present network bandwidth is 10 Mbps which is not sufficient to conduct an assessment in your school.</p>	M
TRT-11	<p>The system shall provide a list of solutions to resolve any issues with the school network.</p> <p>eg Network bandwidth is not sufficient. Present network bandwidth is 10 Mbps. You should upgrade to 100 Mbps.</p>	M
<b>Device Readiness</b>		
TRT-012	<p>The system shall provide the ability to display and record software specific information of a machine. It shall provide information such as but not limited to:</p> <ul style="list-style-type: none"> <li>- web browser name and version</li> <li>- operating system</li> <li>- information about the plugins installed that are agreed as mandatory</li> <li>- pop up blocker enabled</li> <li>- Java Runtime Environment</li> <li>- IP address.</li> </ul>	M
TRT-13	<p>The system shall provide the capability for an authorised user to enter multiple baseline technical specifications such as but not limited to:</p> <ul style="list-style-type: none"> <li>- web browsers and versions supported</li> <li>- plugins supported</li> <li>- device hardware requirements</li> <li>- network bandwidth requirements.</li> </ul>	M
TRT-14	The system shall compare captured device values with baseline technical specifications to calculate machine readiness.	M
TRT-15	<p>The system shall provide information, wherever possible, about how software related issues can be resolved.</p> <p>eg provide links where required versions can be downloaded, or to an FAQ</p>	M

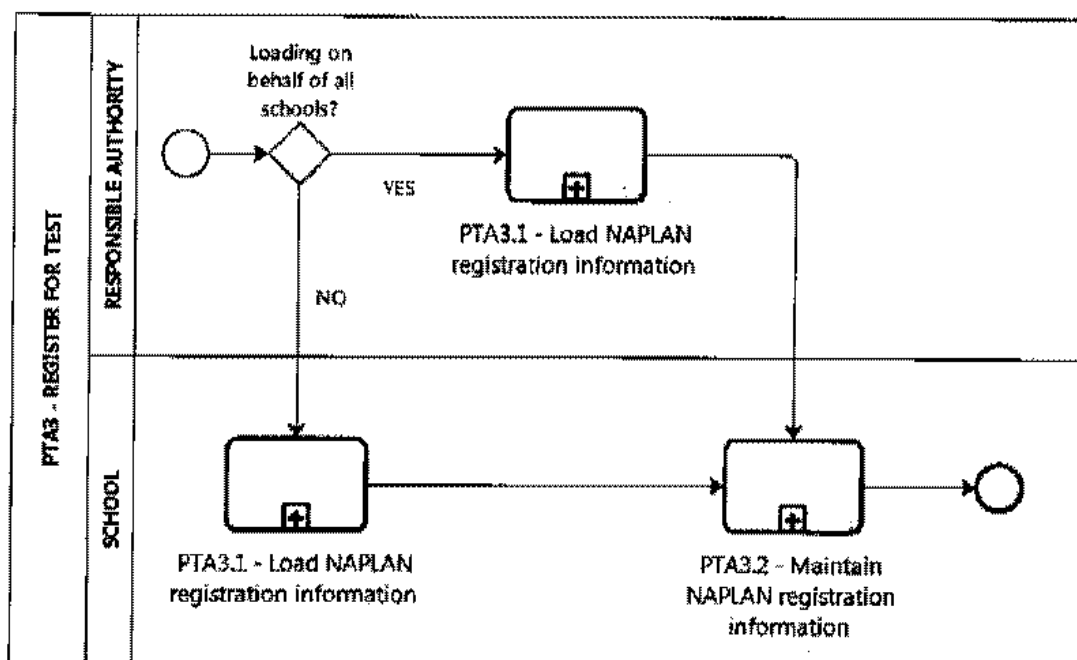
	page.	
TRT-16	The system shall provide the ability to display and record the device information from where it is run. The system shall provide the information such as but not limited to: <ul style="list-style-type: none"> <li>- system RAM</li> <li>- processor</li> <li>- screen resolution.</li> </ul>	M
TRT-17	The system shall provide the ability to run a test module / testlet / test item on a device to ensure a test works as expected.	M
TRT-18	The system shall provide the ability to test an individual device within the school network to identify any issues such as but not limited to: <ul style="list-style-type: none"> <li>- device not able to connect to internet</li> <li>- firewalls</li> <li>- proxy servers</li> <li>- wireless network</li> <li>- ability to access specific required URLs and file types.</li> </ul>	M
TRT-19	The system shall have the ability to record the parameters it collected for an individual device.	M
TRT-20	The system shall provide the ability for an authorised user to add or comment on any of the auto populated parameters for an individual device.	M
TRT-21	The system shall provide a list of reasons and details where it identifies a machine is not able to conduct an assessment.	M
<b>Calculate Readiness</b>		
TR-22	The system shall determine technical readiness based on predefined criteria and responses provided in session planning, network readiness and device readiness input parameters.	M
<b>Reports</b>		
TRT-23	The system shall provide an authorised user to generate different reports to help them understand school readiness for assessments. These reports will provide details (based on user access level) such as but not limited to: <ul style="list-style-type: none"> <li>- schools ready/not ready for an assessment</li> <li>- issues with network readiness, session planning or device readiness in a school</li> <li>- overall percentage of schools ready/not ready for an assessment in a jurisdiction.</li> </ul>	M
<b>User Interface And Accessibility</b>		
TRT-24	The system shall provide the technical readiness tool as a web-based solution.	M
TRT-25	The web-based solution shall be compliant with WCAG 2.0 standards.	M
TRT-26	The system shall provide a utility which can be downloaded and run offline on the school networks/machines.	M



### 3.4 PTA3 – Register for test

The responsible authority – jurisdictional authority, school system authorities (government, Catholic and independent), aggregations of schools and the individual school – updates participating school details, assigns staff to testing roles, registers participating students and affirms, based on outcomes from PTA2, school readiness to participate in the NAP online testing. The required test registration data is supplied by all participating schools to enable their participating students to undertake NAP testing and for their school to be able to administer NAP tests.

#### 3.4.1 Business process diagram



#### 3.4.2 Business requirements

Business Requirement	
<b>ID</b>	PTA3
<b>Name</b>	Register for test
<b>Actors</b>	School – Principal (or delegate) School – NAP Co-ordinator Responsible Authority – Jurisdictional Officer Responsible Authority – School Online Solution Officer ACARA – National Policy and Reporting The system (registration)
<b>Preconditions</b>	1. The actors have successfully completed all PTA2 – Readiness for test at the local level activities required. 2. That the system has access to an authoritative list of Australian schools.
<b>Post Conditions</b>	1. The school – staff and students – are fully registered to participate in the NAP tests. 2. The pre-test participation and accessibility information for a student is captured and available to the system for delivery of the test.

<b>Assumptions</b>	<ol style="list-style-type: none"> <li>1. That the school is the authoritative source for student and staff registration information.</li> <li>2. That an authoritative source for school registration information will be accessible to the system.</li> <li>3. That the system is not required to enable the printing of the NAP tests.</li> <li>4. That the system shall assure the identity of registered students.</li> <li>5. That the responsible authority may want to continue to gather their schools' registration information and load it into the system on their behalf.</li> <li>6. That the responsible authority will continue to require principals (or delegate) to continue to check all loaded data and be able to update, add new and delete student, school and staff data as appropriate.</li> <li>7. That the jurisdictions will continue to want principals (or delegate) to continue to assign NAP testing roles to staff as part of ongoing school management operations.</li> <li>8. That the responsible authority will continue to require principals (or delegate) to continue to be able to assign and/or move students between both test groups and other classes required for returning the Student Reports to teachers and students.</li> <li>9. That the system provides options of interoperability, based on agreed standards, of NAP registration information with the school's SIS, where it is available.</li> <li>10. That where the responsible authority collects the student registration information on behalf of all the participating schools within their authority, the jurisdiction takes responsibility for loading that information into the system on behalf of their schools and confirming registration of participating students.</li> <li>11. That where a school is to supply the student registration information they will have access to the same options as the jurisdiction and school authorities to supply the requested data to the system.</li> <li>12. That the jurisdictions will require principals to confirm registrations prior to committing the updates to the system.</li> <li>13. That change to student data is subject to audit and reporting at the level of the school's responsible authority.</li> <li>14. That the school principal and/or school's responsible authority is accountable for ensuring student registration is complete and accurate.</li> <li>15. That a help desk will be available to the schools during the NAP testing period.</li> <li>16. That the system will use the participating schools information in a number of business processes, including PTA2, PTA3, TA1 and reporting.</li> <li>17. That the principal will be able to delegate NAP test administration responsibility to a NAP Co-ordinator.</li> <li>18. That the Statement of Compliance does not prevent an authorised user from accessing the system but must be completed before s/he can access further services.</li> </ol>
--------------------	---

Requirement ID	Requirement Description	Priority
PTA3-01	The system shall maintain the Statement of Compliance for each school registering for the NAP Assessment event. Note: Statement of Compliance will be defined by discussion and agreement between various stakeholders.	M
PTA3-02	The system shall provide the capability for the responsible authority to confirm all schools within their jurisdiction are NAP online test-ready.	M
PTA3-03	The system shall enable jurisdictions and school authorities to verify: <ul style="list-style-type: none"> <li>- Accessibility(disability) adjustments</li> <li>- Participation entries.</li> </ul>	M
PTA3-04	The system shall support multiple predefined options for loading of school and student registration information via a user interface and CSV import.	M
PTA3-05	The system shall have the ability to integrate with a registration and access system for loading of school and student registration information.	M

PTA3-06	The system shall provide the capability for principals (or delegate) to add new, update, and delete student, school and staff data for their school.	M
PTA3-07	The system shall use the principal's email address to send the initial NAP registration notification as per the security requirements.	M
PTA3-08	The system shall securely manage the school's NAP registration information.	M
PTA3-09	The system shall enable the school principal (or delegate) to update a jurisdiction sanctioned dataset such as telephone, email and fax details.	M
PTA3-10	The system shall provide unique login credentials to registered staff allocated to a NAP testing role.	M
PTA3-11	The system shall provide the capability to flag students and schools that have been identified as not participating in the NAP Assessment.	M
PTA3-12	The system shall provide the capability to report on all students and schools that are NOT part of the current NAP testing cycle.	M
PTA3-13	<p>A school, and/or responsible authority shall be able to load the NAP registration dataset for the current NAP registration period.</p> <p>The NAP registration dataset shall include information on:</p> <ul style="list-style-type: none"> <li>• Student data</li> <li>• Student test data</li> <li>• Staff data</li> <li>• School data</li> <li>• Room data</li> <li>• Test timetable data</li> </ul> <p>See Section 4 - Supporting Documents for NAP registration dataset.</p>	M
PTA3-14	The system shall provide the capability for the school to maintain their NAP registration information for the current NAP registration period.	M
PTA3-15	The system shall provide the capability to capture NAP accessibility adjustments (PNP) for individual participating students as part of NAP registration dataset.	M
PTA3-16	The system shall provide the capability to capture NAP participation information for individual students as part of NAP registration dataset.	M
PTA3-17	The system shall make the NAP Registration dataset available for test administration, psychometric analysis and reporting including and not limited to accessibility and participation information.	M
PTA3-18	The system shall set-up the NAP testing period on the basis of the supplied time parameters.	M
PTA3-19	The system shall to set-up the NAP registration period on the basis of the supplied time parameters.	M
PTA3-20	The system shall capture the following information about staff at the school level: First name, Last name, School role, NAP role and email address for the purposes of NAP administration and login.	M
PTA3-21	The system shall enable the authorised users to search and/or browse across student, school and staff registration information.	M
PTA3-22	The system shall enable the authorised users to export student, school and staff registration information.	M
PTA3-23	The system shall provide the ability to identify students and schools that are part of the current NAP testing cycle but their data is not to be included in the NAP National Report.	M
PTA3-24	The system shall generate student access codes for an assessment event in bulk on the loading of student registration information from a CSV file supplied in an agreed upon format.	M
PTA3-25	The system shall enable authorised users to manually generate student access codes for an assessment event through a web interface.	M

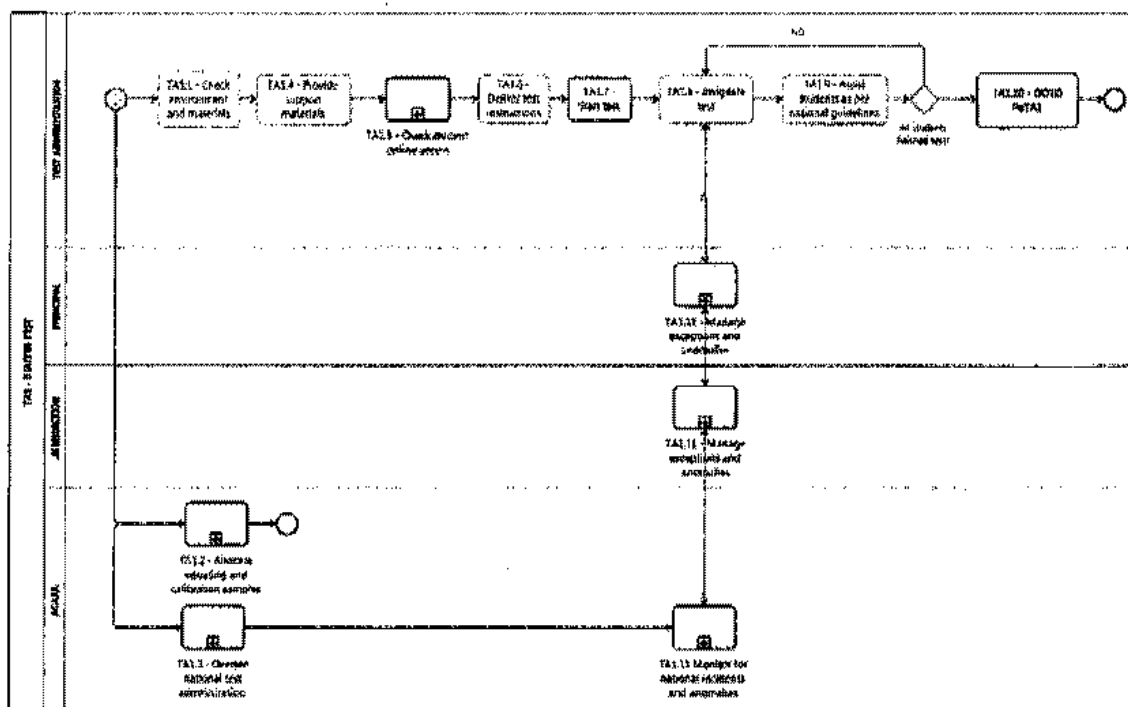
## 3.5 TA1 – Deliver test

This process supports the local delivery of the NAP tests to participating students.

The system is conceptualised to be a solution which:

- students will use to take NAP tests and submit their responses
- school – principals (delegate), school – NAP co-ordinator, school – test administrators and other roles, responsible for administering the tests, will use to start and/or invigilate the test and record exceptions or any other information which is expected from them at the time of administering the tests
- will perform automated scoring of all item types except ExtendedText enabling multi-staged testing pathway to be presented to each participating NAP student thereby supporting Tailored Test Design approach
- will feed student responses to the marking and scoring system for scoring of essays and for human marking
- will feed the student scores to the reporting component for analysis and reporting purposes

### 3.5.1 Business process diagram



### 3.5.2 Business requirements

Business Requirement	
ID	TA1
Name	Deliver test

<b>Actors</b>	School – Principals School – NAP Co-ordinator School – Test Administrators School – Participating Students Responsible Authority – Jurisdictional Officer Responsible Authority – School Online solution Officer ACARA – Test Managers ACARA – Policy and Reporting NAP Help Desk The system (test delivery) The system (marking and scoring) The system (AI – tailored design)
<b>Preconditions</b>	1. The pre-administration activities have been completed and the school is ready to administer the NAP testing. 2. The NAP tests have been approved and are ready for delivery. 3. The system has access to the AI – tailored design engine, automated scoring capability and the marking and scoring.
<b>Post Conditions</b>	1. Students have had an opportunity to participate in NAP tests. 2. Test delivery information is available for reporting. 3. Those student responses that require human marking are available to the expert markers. 4. Essays submitted by students are available to Automated Essay Scoring system for marking and scoring. 5. Automatically scored information is available for reporting.
<b>Assumptions</b>	1. That the test administrator will ensure venue security and accessibility to the system. 2. That the test administrator is still required to do an 'on-the-day' physical check of the testing room. 3. That the test administrator will still be required to actively supervise during the test. 4. That the test administrator will ensure all relevant rules of behaviour and test instructions are understood by students prior to commencing the NAP test. 5. That any walk-in, additional students are not subject to a parental withdrawal or exemption from NAP. 6. That the jurisdiction – responsible authority will want the ability to monitor test progress across their jurisdictional authority. 7. That the school-based exceptions and anomalies are noted and can be evaluated against national procedures and guidelines. 8. That the investigating authority will have experience in evidence collection against national standards. 9. That ACARA will be able to capture the various sampling designs for the selection of samples (eg equating and calibration) as and when required. 10. That the system will contain the student information required to administer the NAP tests to an individual student as well as the descriptive and/or demographic information about students required for psychometric analysis and reporting. 11. That the system will present a student with the correct NAP testlet as per the tailored, multi-staged test design rules. 12. That the IARS will be able to ingest, store and make available all psychometric data in the same manner as currently available.

Requirement ID	Requirement Description	Priority
TA1-01	The system shall provide the capability for the local test administrator to monitor the students' progress through the administration of the NAP tests.	M
TA1-02	The system shall provide the capability for the test administrator to assign or reassign a student to a test group.	M

TA1-03	The system shall provide the capability for the test administrator to register additional students on the day of the test.	M
TA1-04	The system shall provide the capability for the administration of a specific test to a single student or group of students within a class or school.	M
TA1-05	The system shall provide the capability for an authorised user to reset student password on the day of the NAP test.	M
TA1-06	The system shall display key NAP test instructions at appropriate stages of the test session. Note: Complete set of test instructions will be discussed at a later stage.	M
TA1-07	The system shall provide the capability for practice questions at the beginning of the NAP tests.	M
TA1-08	The system shall provide the capability for a student to begin the NAP test without undertaking any practice questions.	M
TA1-09	The system shall provide the capability for the test administrator to log any exceptions and anomalies, for a student and/or group of students.	M
TA1-10	The system shall provide the required tools to support students during testing, ie If calculate use = yes for a test item, then the system shall provide the student with an online calculator. If the test item requires the use of the ruler or protractor, then the system shall provide the student with an online version for their use.	M
TA1-11	The system shall access participating student's PNP information (accessibility requirements) and ensure such options are implemented for participating students during the test. Note: the source of PNP information for participating student is NAP registration dataset which implies that the system shall be able to access this dataset real time.	M
TA1-12	The system shall provide the capability for the test administrator to enter accessibility options used by participating students within their test group on the test day.	M
TA1-13	The system shall provide the capability for the test administrator to access the accessibility information captured during registration (PTA3) for participating students within their test group.	M
TA1-14	The system shall provide the capability for the authorised user to extend the test time for their school. Note: Test time refers to the duration of the test and not the testing window of 2-3 weeks.	M
TA1-15	The system shall provide the capability for the test administrator to extend the test time for an individual student or group of students upon approval from the responsible authority.	M
TA1-16	The system shall capture audit data about the delivery of the NAP tests, including: test start and end times but not limited to these. Note: The complete list of audit information will be discussed at a later stage.	M
TA1-17	The system shall provide the capability for the test administrator to suspend a test for an individual student and/or group of students.	M
TA1-18	The system shall capture information about student participation that can be entered by the test administrator, then audited, verified and updated by the principal (or delegate) and jurisdiction – responsible authority.	M
TA1-19	The system shall provide the capability for the test administrator to start the test delivery to the participating NAP students.	M
TA1-20	The system shall display test items to the participating students enabling them to submit responses.	M
TA1-21	The system shall provide the capability for both the test administrator and student to monitor and view progress through the NAP main test, including, test items remaining; time left to complete assessment, number of test items answered etc.	M
TA1-22	The system shall provide the capability for the responsible authority to monitor test submissions in real time for all schools within their authority through a dashboard or reporting capabilities.	M

TA1-23	Where a disruption occurs, the system shall: 1. display a service disruption message to students and the test administrator 2. capture information about the disruption in an incident log that can be commented on by the test administrator 3. make the incident log information available for reporting.	M
TA1-24	The system shall display a service resumption message to students and test administrators upon the services being restored and capture resumption information within an incident log.	M
TA1-25	Where service has been interrupted, the system shall resume the test from the point the student's test was interrupted.	M
TA1-26	Where service has been interrupted, the system shall apply, at the least, the unused portion of the total time allowed.	M
TA1-27	The system shall have the capability to apply the tailored, multi-staged test design rules provided/required to ensure the student is provided with the correct test items. Refer to TA2 - Apply tailored test design for complete set of requirements which the system must fulfil.	M
TA1-28	The system shall provide the capability for participating students to confirm their submission of a completed NAP test.	M
TA1-29	The system shall capture all test items presented to each participating student – regardless of whether the test item was answered.	M
TA1-30	The system shall provide the capability for a student to save their responses to complete the NAP test as per the national protocols.	M
TA1-31	The system shall provide the capability for a student to submit blank and/or partially completed test item responses.	M
TA1-32	The system shall provide the capability for a student to submit blank and/or partially completed NAP tests.	M
TA1-33	The system shall provide the capability for a student to submit their NAP test responses where the time allowance has expired prior to the student completing the test. The system shall flag these responses so that these responses can be excluded from scoring.	M
TA1-34	The system shall prevent a student from accessing other applications, URLs and/or resources during the period of test delivery, including screen capture but not limited to these security features.	M
TA1-35	The system shall provide the capability for a student to review and change their responses prior to the NAP test being submitted.	M
TA1-36	Where a student makes changes to his/her responses as a result his/her review prior to submission, the system shall capture the changes made and retain the original response for reporting.	M
TA1-37	The system shall simultaneously administer differing versions of the NAP main test (up to 10 as per the tailored, multi-staged test design) to students for a given domain and year level.	M
TA1-38	The system shall provide the capability to assign a student or group of students to a specific sample and then assign a predetermined or randomly chosen test to students within the sample.	M
TA1-39	The system shall be able to apply sampling designs to randomly select students for sample testing.	M
TA1-40	The system shall make all test delivery information available for reporting, including registration, participation, accessibility, test responses and test response scores.	M
TA1-41	The system shall link the test item to the test item response; the student to the test item and the student to the test item response.	M
TA1-42	The system shall make all test related data available for reporting, including student details, student responses, tailored test pathway presented including items, testlets, tests taken and user experience status but not limited to these.	M

TA1-43	The system shall adhere to technical standards for receiving and unpacking tests, including all items, stems, resources, stimuli, marking/scoring information, assets, metadata of all types, assessment framework related information and any other information pertinent for delivering the NAP tests as received from the IARS and/or the test development component of the system.	M
TA1-44	The system shall provide all defined test session usage data (paradata) completion of the NAP test for reporting.	M
TA1-45	The system shall be able to display items in html 5 specified as a 'QTI extension'.	M
TA1-46	The system shall be able to support offline delivery modes and the related requirements.	M
TA1-47	The system shall provide the capability for the test administrator to edit/update student's registration information on the test day.	M
TA1-48	The system shall provide a web user interface for a participating student to take a test with features such as but not limited to login/logout, timer, calculator, ruler, protractor, forward and backward navigation through the test, viewing test summary, testlet/test submission, review capabilities etc.	M
TA1-49	The system shall provide a web user interface for a local test administrator to perform tasks such as register a student, monitor progress, raise escalation and similar tasks etc.	M
TA1-50	The system shall not allow printing of the NAP tests and/or individual test items during a test session.	M
TA1-51	The system shall provide the capability for the responsible authority to monitor test progress across their jurisdictional authority.	M
TA1-52	The system shall provide the ability for a test administrator to stop, pause and resume a test for an individual student or a group of students.	M
TA1-53	The system shall be able to administer time limited tests.	M
TA1-54	The system shall have the ability to dynamically stop the timer while loading the next resource/stimuli. This will allow for equal test response time irrespective of test deployment method (online or offline/low-bandwidth).	M
TA1-55	The system shall have the ability to render an item in a certain way as indicated by the item authoring system. Item authoring system has custom metadata field for items which indicate if the item needs to be implemented with drag and drop functionality. In future, this field can have more values to indicate different rendering schemes.	M
TA1-56	The system shall allow local test administrator to assign test administrator login credentials to other users.	M
TA1-57	The system shall allow local test administrator to assign or reassign one or more invigilation roles to a test event.	M
TA1-58	The system shall provide users with the ability to navigate through test items in a sequential and/or non-linear order.	M
TA1-59	The system shall have the ability to provide students real-time feedback both for correct and incorrect responses for a practice test.	D
TA1-60	The system shall provide the ability for a local test administrator to view their assigned tests with associated student registration details.	M
TA1-61	The system shall provide the ability for authorised users to complete the test submission and readiness for marking and scoring on behalf of a student.	M
TA1-62	The system shall allow a student to toggle the display of the time remaining for a test on or off.	M
TA1-63	The system shall provide the ability to skip test items and submit the test with a nil response.	M
TA1-64	The system shall provide the ability for a student to skip test items and return to complete those items before submitting the test within the agreed business rules (such as test period).	M



TA1-65	The system shall provide the capability to prevent the students from modifying their responses once the time expires and the student has still not submitted the test.	M
TA1-66	The system shall provide the capability to capture timeframe parameters with the NAP main test. See Appendix A – Timeframe Parameters for detailed listing.	M
TA1-67	The system shall be able to deliver tests/assessments constructed on requirements listed in sections TD3 and TA2.	M
TA1-68	The system shall provide students with a visual indicator in a test that can be toggled to bookmark (flag) an item for review, whether or not the item has been completed.	M
TA1-69	The system shall integrate with item bank to provide paradata in an agreed format on the items administered in a test.	M
TA1-70	The system shall have the ability to provide a questionnaire.	M
TA1-71	The system shall allow a questionnaire to be voluntary or compulsory.	M

### 3.5.3 Offline delivery

Offline and low-bandwidth delivery and presentation involves the delivery of tests to the students and the tools necessary to support test invigilation and supervision, but in an offline and/or low-bandwidth environment. Like online delivery and presentation, this process will also include some automated scoring for multi-stage branching and summative assessments.

Requirement ID	Requirement Description	Priority
OFF-01	The system shall be able to provide an offline delivery system that fits on a USB drive.	M
OFF-02	USB drives shall contain student registration information that will be loaded centrally, assuming appropriate student registration data has been supplied prior to USB drive delivery to schools.	M
OFF-03	Test data on the USB drive shall be stored in encrypted form.	M
OFF-04	The system shall be able to block students who attempt to complete test responses on different USB drives.	D
OFF-05	Each USB drive shall have tests loaded for every domain.	D
OFF-06	Each USB drive shall have tests loaded for all relevant year levels.	D
OFF-07	The system shall have a client server version that can be deployed on a school LAN and used as a local test server.	M
OFF-08	The system shall be available in an application package for pre-installation on tablet devices (IOS and Android).	M
OFF-09	The system shall be available as an application for pre-installation on a PC (similar to the package on the USB).	M
OFF-10	The system shall provide the ability for USB devices to be serialised.	M
OFF-11	The system shall provide the ability for a test administrator to download a copy of encrypted and final NAP test questions and testlets to be able to install on a networked device and use it as a cache for low-bandwidth delivery.	M
OFF-12	The system shall be able to recognise a local cache of test content on the school LAN and connect to it for test delivery instead of fetching content from the online system.	M
OFF-13	The system's client server version shall be able to be remotely deployed on the school LAN.	D
OFF-14	The system shall provide the ability to display all the item types for a test.	M

OFF-15	The system shall have the ability to provide a questionnaire.	M
OFF-16	The system shall allow a questionnaire to be voluntary or compulsory.	M
OFF-17	The system shall have the ability to record and maintain all test event related data, such as but not limited to student participation information, item responses, test timings, any exceptions etc.	M
OFF-18	The system shall provide users with the ability to navigate through test items in sequential and non-linear order.	M
OFF-19	The system shall have the ability for a test to be timed.	M
OFF-20	The system shall allow for appropriate branching rules for testlets in multi-stage branching testing.	M
OFF-21	The system shall provide the ability to deliver staged adaptive tests as well as fixed-form tests as part of the same test event.	M
OFF-22	The system shall use the correct algorithm defined in the test metadata in the delivery of staged adaptive testing.	M
OFF-23	The system shall have the ability to store algorithms created as part of test construction.	M
OFF-24	The system shall have the ability to score all item types except ExtendedText type questions and descriptive questions in an offline and low-bandwidth environment.	M
OFF-25	The system shall have the ability to auto-score some of the item responses and send these raw scores to the scoring system for final scoring where applicable.	M
OFF-26	The system shall be able to link and deliver next staged testlet based on algorithm for correct and/or incorrect student responses.	M
OFF-27	The system shall allow the non-marked practice test to be mandatory or voluntary. It shall also provide the ability for a student to indicate completion or bypassing the non-marked practice test items or start a test without taking the non-marked practice test.	M
OFF-28	The system shall cater for support exception management at the national and jurisdictional levels, including human intervention while investigating any incidents. Such support will enable any decisions made to be recorded and reported.	M
OFF-29	The system shall provide a tailored version of the test administrator client for offline systems not running in a client-server mode.	M
OFF-30	The system shall provide the ability for a test administrator to start, suspend, stop, pause and resume a test for students.	M
OFF-31	The system shall have the ability to provide students real-time and explanatory feedback both for correct and incorrect responses for a non-marked practice test.	M
OFF-32	The system shall provide students with the ability to confirm their readiness to submit a completed test.	M
OFF-33	The system shall provide the ability to skip test items and submit the test with a nil response.	M
OFF-34	The system shall provide the ability to skip test items and not submit the test.	M
OFF-35	The system shall provide the ability for a student to skip test items and return to complete those items before submitting the test within the agreed business rules (such as test timeframe).	M
OFF-36	The system shall provide the ability for a student to submit the test without providing responses to all of the items in the test.	M
OFF-37	The system shall provide the ability for students to submit a test when they have completed the test items.	M

OFF-38	The system shall provide the ability for a partial test to be submitted if the time has expired before the student completes the test.	M
OFF-39	The system shall provide the ability for a student to modify responses to any test item prior to submitting the test.	M
OFF-40	The system shall implement accessibility options, where required, for the participating students during the test.	M
OFF-41	The system shall provide the capability to prevent the students from modifying their responses once the time expires and the student still has not submitted the test.	M
OFF-42	The system shall provide students with the ability to resume an interrupted test/questionnaire and only the unused portion of the total time allowed is provided.	M
OFF-43	The system shall have the ability for a student to view their assigned test as well as non-assessable practice tests related to the test.	M
OFF-44	The system shall provide the required tools to support students during testing, ie If calculate use = yes for a test item, then the system shall provide the student with an online calculator. If the test item requires the use of the ruler or protractor, then the system shall provide the student with an online version for their use.	M
OFF-45	The system shall display the key instructions relating to test delivery at appropriate stages of the test period.	M
OFF-46	The system shall allow the upload and synch of data from the offline data stores including USB to the central online data stores.	M
OFF-47	The system shall provide all defined metadata at the completion of the NAP test for reporting.	M
OFF-48	The system shall have the ability to log exceptions during the administration of the assessment (such as, a fire drill, internet connection problem).	M
OFF-49	The system shall implement strict measures to prevent copying of the assessment and assessment related material when delivering an assessment in offline mode.	M
OFF-50	The system shall have a robust offline USB drive management process to maintain offline data security.	M
OFF-51	The system shall be able to deliver tests/assessments constructed on requirements listed in sections TD3 and TA2.	M

## 3.6 TA2 – Apply tailored test design

This business process supports the local delivery of the NAP online tailored tests as a multi-stage branching test to participating NAP students using automated scoring capability of the system.

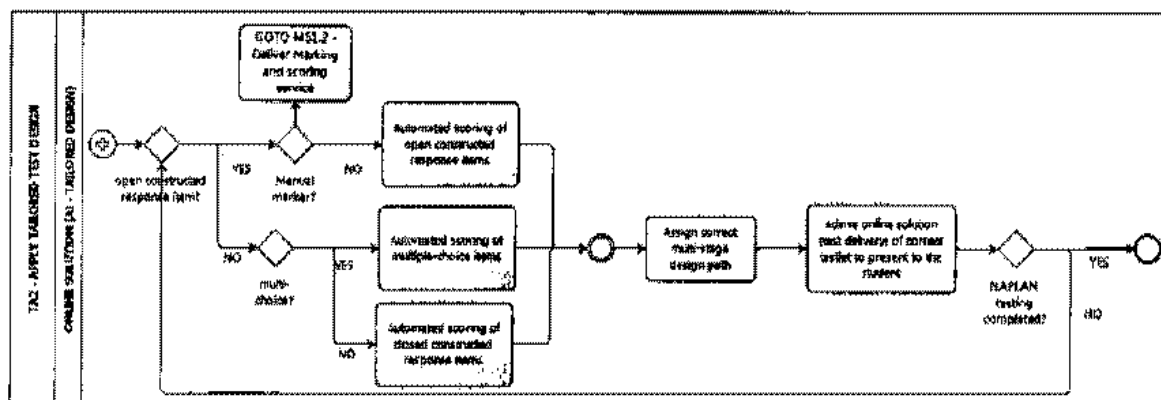
It is expected that automated scoring will be applied within the delivery system to enable tailored test design approach. This will allow correct multi-staged testing pathway to be presented to each participating NAP student.

The following responses will be auto-scored by the system

- a) Multiple-choice multiple selection (MCM) or Choice Interaction in QTI terminology
- b) Multiple-choice single selection (MCS) or Choice Interaction in QTI terminology
- c) All other item types except open constructed response items or ExtendedText in QTI terminology

Open constructed response items are not within the scope of tailored test design approach. Refer to MS1 – MARK and SCORE TESTS to find out more details on these items types.

### 3.6.1 Business process diagram



### 3.6.2 Business requirements

Business Requirement	
ID	TA2
Name	Apply tailored test design
Actors	The system (test development) The system (test delivery) which includes tailored test design and automated scoring capability The system (reporting)
Preconditions	1. TD3.4 – Test Design Quality Assurance has been successfully completed. 2. The NAP main test is being administered to participating NAP students.
Post Conditions	1. The system has presented the correct multi-staged testing pathway to each participating NAP student.
Assumptions	1. That the system will present a student with the correct NAP testlet as per the tailored, multi-staged test design rules applied within TA2.

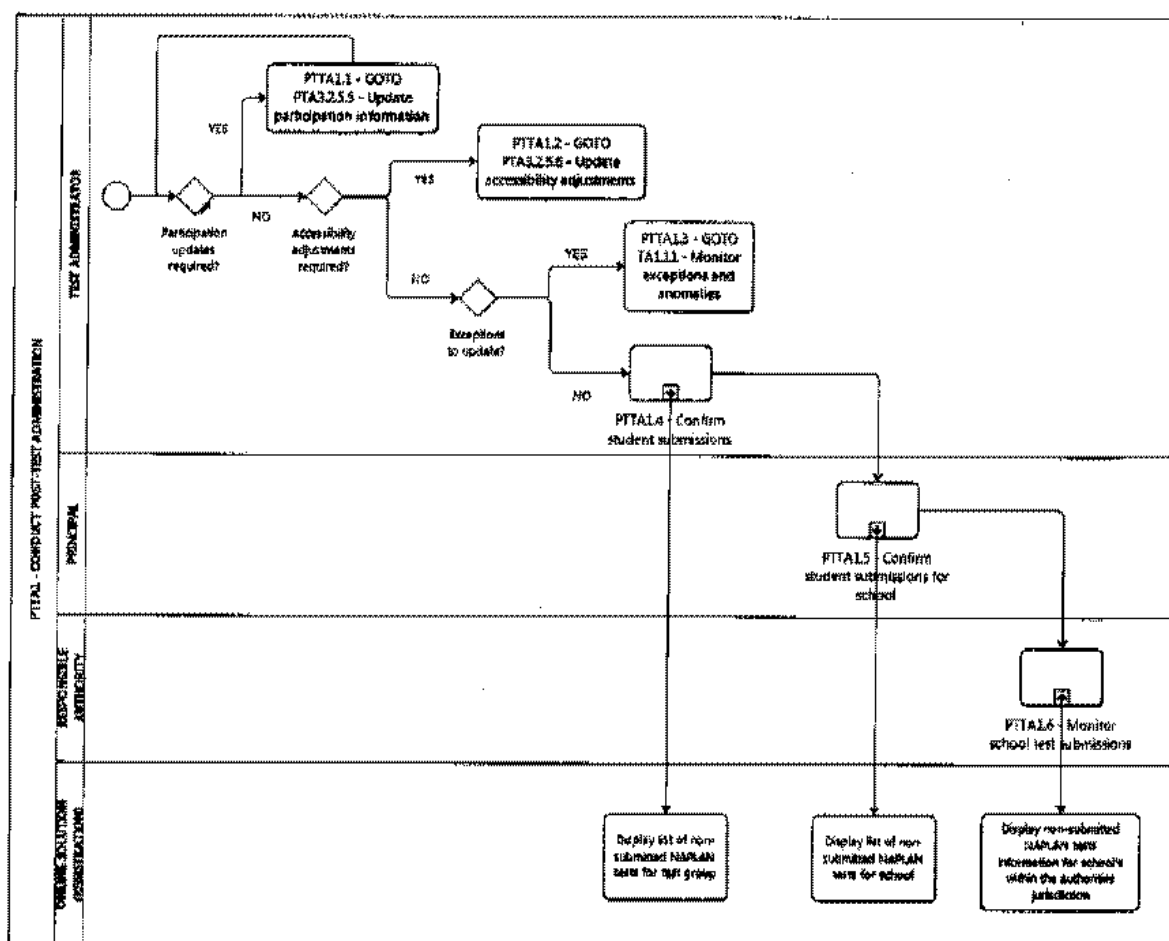
Requirement ID	Requirement Description	Priority
TA2-01	The system shall apply specified tailored, multi-stage test design rules.	M
TA2-02	The system shall provide the capability for the authorised ACARA users to review the tailored, multi-staged testing results.	M
TA2-03	The system shall access or contain the marking information for the test items being administered for the purpose of automated scoring.	M
TA2-04	The system shall access relevant marking and scoring information for a test item directly from the Item Authoring and Review System or test development.	M
TA2-05	The system shall perform real time automated scoring of items other than ExtendedText type during the NAP test delivery.	M
TA2-06	The system shall have the capacity to support marking of all the NAP tests in real time being administered on the same day and at the same time.	M
TA2-07	The system shall allow scripted testing of the branching algorithm at the QA stage.	M
TA2-08	The system shall make all scoring, marking, quality and audit information available for reporting within the system.	M
TA2-09	The system shall provide the capability for authorised ACARA users to indicate an item or a selection of items whose responses should not be used in the implementation of the relevant branching algorithm.	M
TA2-10	The system shall score and store student responses that are determined to be available for automated scoring.	M

TA2-11	The system shall capture and store all scores for marked student responses.	M
TA2-12	The system shall have the capability allow customisable user roles.	M
TA2-13	The system shall allow a student to edit their responses within all testlets assigned to them by the multi-stage branching algorithm. The changes due to edited answers shall not change the path through their existing responses in other testlets. ie the algorithm will not change the path set when students have completed one or more of the preceding testlets and are editing their responses.	M
TA2-14	The system shall provide the capability for the authorised ACARA users to configure the NAP auto-scoring capability.	M

## 3.7 PTTA1 – Conduct post-test administration

This business process captures those activities carried out after the NAP tests have been administered to the participating students.

### 3.7.1 Business process diagram



### 3.7.2 Business requirements

Business Requirement	
ID	PTTA1

<b>Name</b>	Conduct Post-test Administration	
<b>Actors</b>	School – Test Administrator School – Principal (or delegate) School – NAP Co-ordinator Responsible Authority – Jurisdictional Officer Responsible Authority – School Online solution Officer ACARA – Policy and Reporting The system (registration) The system (test delivery)	
<b>Preconditions</b>	1. Students have completed the NAP test.	
<b>Post Conditions</b>	1. Student participation information is current and correct. 2. Student accessibility information is current and correct. 3. Student demographic information is current and correct. 4. Student test experiences are confirmed as either <i>standard</i> or <i>non-standard</i> .	
<b>Assumptions</b>	1. That the system will support the national incident (exceptions and anomalies from standard test requirements) monitoring and reporting process in a transparent and verifiable way for multiple users. 2. That test experience status information could be recorded and/or updated over a period of time. 3. That where a student's response data is 'held' it may be subjected to an alternative data treatment path.	
<b>Requirement ID</b>	<b>Requirement Description</b>	<b>Priority</b>
PTTA1-01	The system shall provide the capability for the local test administrator to enter and update participation information, ie Student A has only completed 50% of the test before having to go to sick bay. Participation codes may include: <i>Present, Absent, Sanctioned Abandonment, Withdrawn, and Exempt</i> .	M
PTTA1-02	The system shall capture the participation information and make it available for reporting.	M
PTTA1-03	The system shall provide the local test administrator with the submission status information for all students within his/her test group.	M
PTTA1-04	The system shall provide the authorised user with the submission status information for all participating NAP students within his/her school.	M
PTTA1-05	The system shall provide the capability for the responsible authority to monitor NAP test submissions.	M
PTTA1-06	The system shall provide the capability to capture and report exceptions and anomalies against the impacted student and/or group of students, at any point during and after the administration of the NAP tests, by test administrators, principals and responsible authorities.	M
PTTA1-07	Where an exception and/or anomaly is captured against a student and/or group of students, their NAP test item responses shall have a status of 'held' until the test experience has a status of 'standard'.	M
PTTA1-08	The system shall notify the nominated investigation authority that an incident has been recorded.	D
PTTA1-09	The system shall enable relevant parties to contribute information to the investigation and capture relevant actions progressively.	D
PTTA1-10	The system shall notify relevant parties of updates to the investigation information.	D
PTTA1-11	The system shall enable test incident auditing at school, responsible authority and national levels.	M
PTTA1-12	The system shall make all test incident information available for reporting.	M
PTTA1-13	The system shall provide the principal (or delegate) the ability to confirm the NAP test submissions for the school.	M

## 3.8 Mark and score tests

This process enables both quality assured (QA) manual marking and automatically scored constructed – open extended responses by the system.

Conceptually, the solution comprises of two sub-systems.

- Automated Essay Scoring (AES): For automated marking and scoring of ExtendedText item types (essays).

Note: The system shall support the processes for the management of the AES engine such as the selection and submission of pre-scored sample scripts for the training of the AES engine and the review of AES engine scored assessments for QA purposes. The system does not have to provide the AES engine but integrate to it.

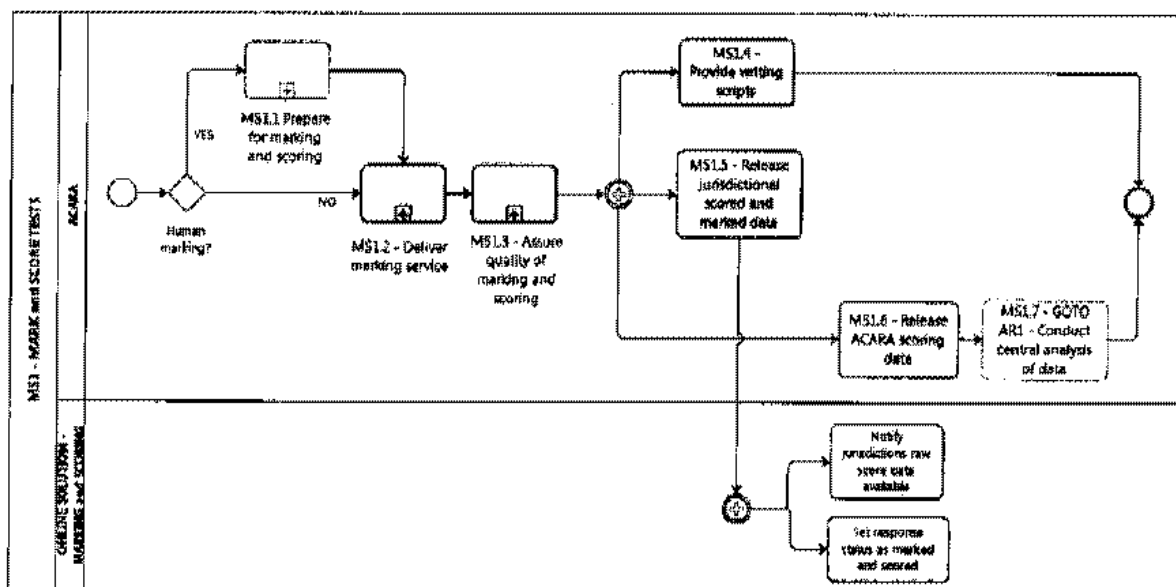
- Human Marking and QA System (HMQS): for managing and monitoring all human intervention in the marking and scoring process. Note: There may not be one standalone system that can meet all requirements listed under HMQS. This is done to provide clarity and group all related requirements together.

It is expected that these two sub-systems together with automated scoring within the system will be able to deliver the required solution which meets ACARA business requirements on marking and scoring.

Open constructed response items – can be both automated scoring and manually marked as following:

- Constructed response – Open Extended (CR-OE) or ExtendedText item type or essays, eg Writing; these will be marked using AES.
- Constructed response – Open – Short (CR-OS) or ExtendedText item type for reading and writing domains. The responses to such items types are not short enough that they can be marked by automated scoring capability within system and are not long enough that AES can be trained for them; these will be marked manually using HMQS.

### 3.8.1 Business process diagram



### 3.8.2 Business requirements

Business Requirement	
ID	MS1
Name	Mark and score tests

<b>Actors</b>	ACARA – Test Managers ACARA – Policy and Reporting Expert Markers The system (marking and scoring) - Automated Essay Scoring (AES) and Human Marking and Quality Assurance System (HMQS) The system (test delivery) The system (Reporting)
<b>Preconditions</b>	1. The NAP trialling scripts are available within the system. 2. The NAP tests are being administered. 3. Participating students are submitting responses to the NAP tests. 4. The system has access to the required marking and scoring information related to each test items and/or testlet. 5. Automated Essay Scoring is trained using sample scripts marked via HMQS or ingested from other sources. 6. The expert markers are fully trained and able to carry-out marking.
<b>Post Conditions</b>	1. Participating student test submissions are correctly marked and scored, either manually or automatically. 2. The raw marked and scored data is available for: <ul style="list-style-type: none"> <li>a. school-level analysis and reporting</li> <li>b. jurisdictional-level analysis and reporting</li> <li>c. national analysis and reporting</li> </ul> 3. That the system will contain the marked information related to the NAP test items administered.
<b>Assumptions</b>	1. That, with agreement from stakeholders, domain data will be progressively released to schools, to enable rapid turnaround of initial student performance data as close as possible to the conclusion of the test. 2. That where AES is employed, quality review will be undertaken by qualified markers using the Human Marking System (HMQS) during the preparation for and training of the AES system/s. 3. That escalation criterion is available to be defined within the system and AES if possible 4. That the expert markers can be located anywhere in Australia without loss of marking accuracy, consistency and validity. 5. That automated scoring of relevant test responses will be implemented within the system during the delivery of the test and AES for NAP. 6. That the markers hierarchy will be used to distribute random samples of student responses to QA markers throughout the scoring process.

Requirement ID	Requirement Description	Priority
MS1-01	The system shall provide the capability for manual scoring of NAP test item – items types within scope of NAP online tests.	M
MS1-02	The system shall provide capability to ingest marking rubrics, marking & scoring guidelines and any additional information for human marking of the responses.	M
MS1-03	The system shall provide the capability for human markers to record marks assigned to student test item responses, along with relevant commentary.	M
MS1-04	The system shall provide the capability for human markers to mark multiple tasks and multiple genres/text types simultaneously.	M
MS1-05	The system shall provide the capability for markers to record a score for each response; record scores for each criterion on the marking rubric, for each response; select which of the two responses would merit a higher overall score; select which of the two responses would merit a higher score for each criterion on the marking rubric.	M
MS1-06	The system shall have the capacity to support all human markers marking the NAP tests on the same day and at the same time.	M



MS1-07	The system shall provide the capability to assign more than one score from differing sources.	M
MS1-08	The system shall provide the capability to capture student's final mark, where more than one score is assigned.	M
MS1-09	The system shall allow authorised users to flag individual as well as multiple responses as marked, escalated or other required status.	M
MS1-10	The system shall provide the capability, via an interface, to ingest and review representative sample of responses from test delivery, AES and human marked scripts within HMQS to support online quality assurance activities.	M
MS1-11	The system shall provide the capability, via an interface, for a customised selection of training responses from the pool already contained within the HMQS and the AES systems.	M
MS1-12	The system shall provide the capability, via an interface, to accept a selection of training responses (scored essays and associated metadata) generated outside the AES such as from HMQS or other sources for the training of the AES engine.	M
MS1-13	The system shall provide the capability for custom assignment of de-identified student responses to markers for human marking.	M
MS1-14	The system shall provide the capability for random assignment of de-identified student responses to markers for human marking.	M
MS1-15	The system shall provide capability for human intervention in the marking and scoring process at any time. This may be required, for instances, where an escalation has been raised and marking process needs to be altered/stopped/resumed for a particular response or a set of responses.	M
MS1-16	The system shall provide capability to override a previously marked score.	M
MS1-17	The system shall provide the capability to create and view custom reports on human scoring eg marking pattern, speed of marking etc. for individual markers.	M
MS1-18	The system shall provide the capability to create and view custom reports on automatic scoring for all item types.	M
MS1-19	The system shall provide the capability to create and view custom reports on quality assurance activities.	M
MS1-20	The system shall support customisable user roles with appropriate authorisation and authentication mechanism in place.	M
MS1-21	The system shall be accessible over the internet via a user interface. It will allow an authorised marker to access HMQS via Internet from anywhere and shall support the process of nationally distributed marking managed from different marking centres.	M
MS1-22	The system shall provide capability to enable real time monitoring while human marking is taking place.	M
MS1-23	The system shall be a multi-tenanted system to allow multiple levels of management, review and support for various responsible authorities participating in the human marking and quality assurance process.	M
MS1-24	The system shall allow authorised users to mark/score only those responses which are assigned to them. The users shall not be able to view responses assigned to other authorised users.	M
MS1-25	The system shall have the ability to mark the flagged escalated responses as confidential and make it accessible by authorised users only.	M
MS1-26	The system shall have the ability to notify the respective authorised users when one or more student's responses are escalated and/or flagged for review.	M
MS1-27	The system shall have the ability for a marker to mark a test and generate a non-final score for the test based on marked responses, if some of the responses have not been marked and are escalated.	M
MS1-28	The system shall support the ability for an authorised user to mark/score an escalated response assigned to them.	M

MS1-29	The system shall support the ability for an authorised user to generate a final score after marking/scoring the escalated responses assigned to them.	M
MS1-30	The system shall make available for marking and scoring all test items delivered to a student regardless of whether the student has responded to that item or not.	M
MS1-31	The system shall provide the capability to automated score all item types with the possible exception of ExtendedText item type. Note: Refer to TA2 - Apply tailored test design for complete set of requirements on automated scoring by the system.	M
MS1-32	The system shall provide a mechanism by which test result data may be extracted for further processing and/or psychometric analysis.	M
MS1-33	The system shall support the selection of response samples for national calibration and make the samples available when required in an agreed format.	M
MS1-34	The system shall support selection of response samples for national equating and make the samples available when required in an agreed format.	M
MS1-35	The system shall support the ability to specify sample framework criteria to select a sample set of responses in an agreed format.	M
MS1-36	The system shall integrate with the external automated essay scoring engine using the agreed technical standards.	M
MS1-37	The system shall authorise ACARA users to manage access and authorisations to the NAP Protected Environment for the NAP auto-scoring capabilities.	M
MS1-38	The system shall support the processes for the management of the AES engine such as the selection and submission of pre-scored sample scripts for the training of the AES engine and the review of AES engine scored assessments for QA purposes.	M

### 3.9 Analysis and reporting

The performance of students in NAP is reported on a set of NAP scales that enable comparison of results across Years 3, 5, 7 and 9 within the same domain. NAP scales are also designed to allow for the longitudinal tracking of performance by students, schools and school systems and to that end an equating study is conducted each year.

NAP scales are constructed during the AR1 Central Analysis of Data project and are based on the results collected from a representative sample of Australian students. This sample is referred to as the National Calibration Sample. The equating study is conducted using a sample of students (the Equating Sample), that are not already selected in the National Calibration sample.

The construction of the NAP scale requires significant psychometric expertise and the use of the specialised tools and thus psychometric analysis, evaluation of item and tests performance and other elements of scale construction, including the vertical scaling and longitudinal equating, will be completed outside of the system. However, the outcomes of the NAP scale construction, in terms of the items, tests and scale parameters will be prepared for and ingested in to the system.

The following generic analysis and reporting business requirements have been identified. The requirements relate to a cycle of the analysis and reporting of assessment events. Longitudinal reporting is not within the scope of the Assessment Delivery system.

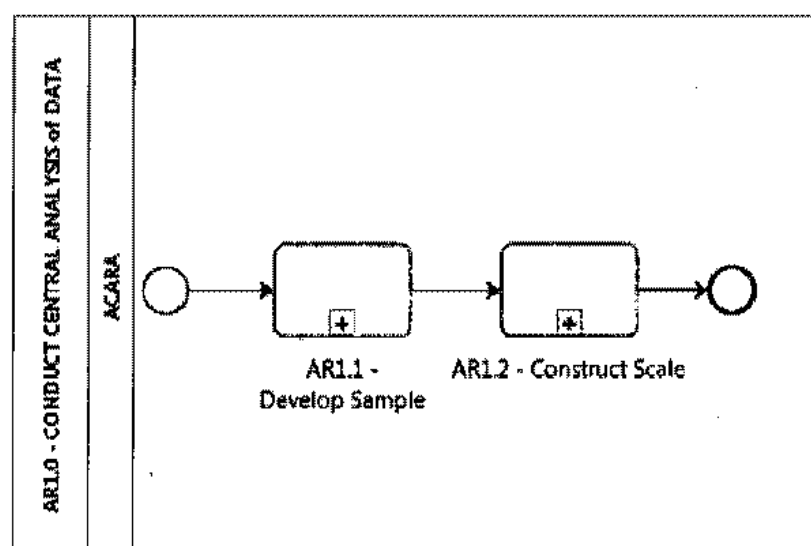
Requirement ID	Requirement Description	Priority
ARG-01	The system shall provide a standardised reporting service to authorised NAP users.	M
ARG-02	The system shall provide the capability to generate a set of predefined standard reports.	
ARG-03	The system shall provide the ability to download data extracts to authorised NAP users.	M
ARG-04	The system shall provide various ways to view NAP data, including graphical representations.	M
ARG-05	The system shall provide the capability to search and browse reports, including ability to search and browse by metadata fields and multiple criteria eg year, year level, domain, sub-domain, jurisdiction and any combination of these, but not limited to these.	M
ARG-06	The system shall provide the ability to query the data with multiple criteria.	M
ARG-07	The system shall restrict the data extracts available to users based on the roles assigned to them.	M
ARG-08	The system shall enable an authorised user to upload scaled data including score equivalency table.	M
ARG-09	The system shall enable authorised users to upload agreed ACARA supplied data and merge with existing metadata for testlets or complete tests.	M
ARG-10	The system shall have the ability to ingest the agreed ACARA supplied datasets, including score-equivalence and plausible value (PV) estimates.	M
ARG-11	The system shall have the ability to ingest the set of plausible values (PV) estimates for each student.	M
ARG-12	The system shall ingest and securely store the national outcomes dataset.	M
ARG-13	The system shall provide access to raw scored data set.	M
ARG-14	The system shall provide the ability to export scaled data.	M
ARG-15	The system shall provide the means for authorised jurisdiction users to access and download school related data such as but not limited to schools marked and scored response summary data (raw data) within the boundaries of their authority.	M
ARG-16	The system shall provide the ability to export data in a format based on agreed technical standards.	M
ARG-17	The system shall enable both manual initiation and/or automated initiation of exports.	M

ARG-18	The system shall enable an authorised user to download any report in agreed format such as but not limited to excel, csv, and pdf.	M
ARG-19	The system shall enable an authorised user to generate (preview, print, download) reports on assessment domains by year levels.	M
ARG-20	The system shall enable an authorised user to generate (preview, print, download) item analysis report.	M

## 3.10 AR1- Conduct central analysis of data

This process captures all the activities involved to conduct the central analysis of the NAP raw scored data.

### 3.10.1 Business process diagram



### 3.10.2 Business requirements

Business Requirement	
ID	AR1
Name	Conduct central analysis of data
Actors	ACARA – Psychometricians Service Provider – Data analysis The system – Reporting The system – Test Development
Preconditions	1. ACARA has released the quality assured marked and scored data for analysis. 2. The service provider has the correct access and authorisations to the system.
Post Conditions	1. The NAP scale and scaling parameters, including the score equivalency tables are available for the system to consume.

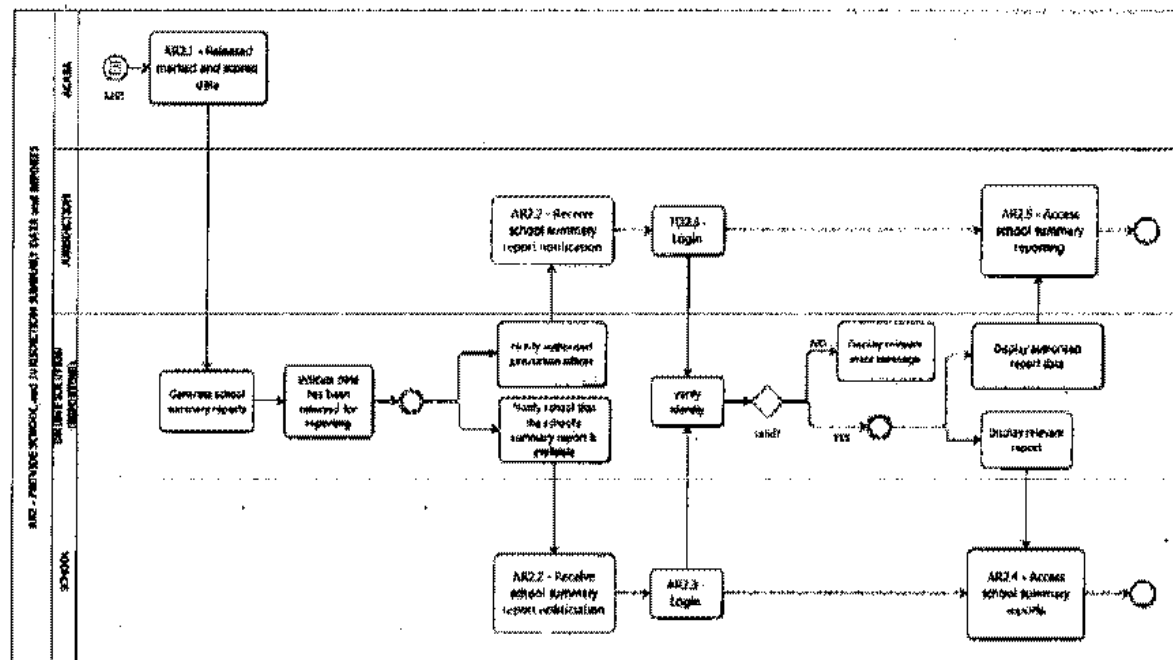
<b>Assumptions</b>	<ol style="list-style-type: none"> <li>1. That the Central Analysis Data service (CAD) will have access to the required data when and as required (national representative sample, and other samples as determined by ACARA, of de-identified analytical data at the required points within the NAP process).</li> <li>2. That the system will enable authorised ACARA users to identify students and samples and access their data directly, as appropriate, when and as required. (identity management, tests management item, school enrolments and test responses data).</li> <li>3. That identity management is operating within the system, providing a high level of confidence that the test item responses are matched to the correct student for the Item response matrix.</li> <li>4. That data cleansing is a function of the Assessment Delivery system.</li> <li>5. That the jurisdiction has confirmed that its test data is fit for national report usage.</li> <li>6. That the system will provide absolutely accurate and error free data.</li> <li>7. That the national report will not be published in PDF format thereby allowing for time savings.</li> <li>8. That the system will enable the provision of data to the jurisdictions, school authorities, schools and other users.</li> <li>9. That the system will assure a level of data quality that does not require further QA activities with the jurisdiction and ACARA.</li> <li>10. That the system will be able to ingest and extract required psychometric information about test item and scale performance.</li> <li>11. That the psychometric data will include graphics.</li> </ol>
--------------------	---

<b>Requirement ID</b>	<b>Requirement Description</b>	<b>Priority</b>
AR1-01	The system shall provide a means that enables authorised users to extract student NAP response data as per the NAP Analysis Extract specification, ie the student response data is merged with all required student demographic information and all corresponding item and test metadata. ACARA will provide the NAP Analysis Extract specification once it is finalised.	M
AR1-02	The system shall be able to integrate with an external issue management system to enable the capture of any feedback from CAD on any anomalies found with the data during analysis.	M
AR1-03	The system shall be able to assign a status such as "Ready for download", "Issue Raised" to a data extract.	M
AR1-04	The system shall be able to control the availability of a data extract based on the status assigned to it.	M
AR1-05	The system shall provide the ability to ingest and assign the item performance data to the items in the Item bank that stores the item metadata and trial and subsequent performance data for items, testlets and main tests.	M
AR1-06	The system shall provide the ability to load scored equivalence tables by authorised ACARA users and make it available to authorised reporting users.	M
AR1-07	The system shall provide the ability for authorised ACARA users to access de-identified student result information.	M
AR1-08	The system shall provide the ability for authorised ACARA users to view de-identified student result information across multiple assessments delivered via the system. Note: Jurisdictions shall provide a consistent student identifier which can be linked across multiple assessments.	M

### 3.11 AR2- Provide school and jurisdiction summary data and reports

This business process enables the provision of a new report titled 'School Summary Report' to support teachers gaining early insight into their students' responses across the NAP test domains. The School Summary Report is based on raw scored data.

### 3.11.1 Business process diagram



### 3.11.2 Business requirements

Business Requirement		
<b>ID</b>	AR2	
<b>Name</b>	Provide school and jurisdiction summary data and reports	
<b>Actors</b>	ACARA – Psychometricians ACARA – Test Managers Responsible Authority – Jurisdictional Officer Responsible Authority – School Online solution Officer School – Principal School – NAP Co-ordinator School – Teachers The system (reporting)	
<b>Preconditions</b>	1. 2.	ACARA has released the raw marked and scored data for reporting. The Student and School Summary Report template is available to the system.
<b>Post Conditions</b>	1. 2.	The responsible authority has accessed the raw marked and scored NAP data for their schools and students for their own reporting purposes. The school has accessed the raw marked and scored NAP data for their students for their own purposes.

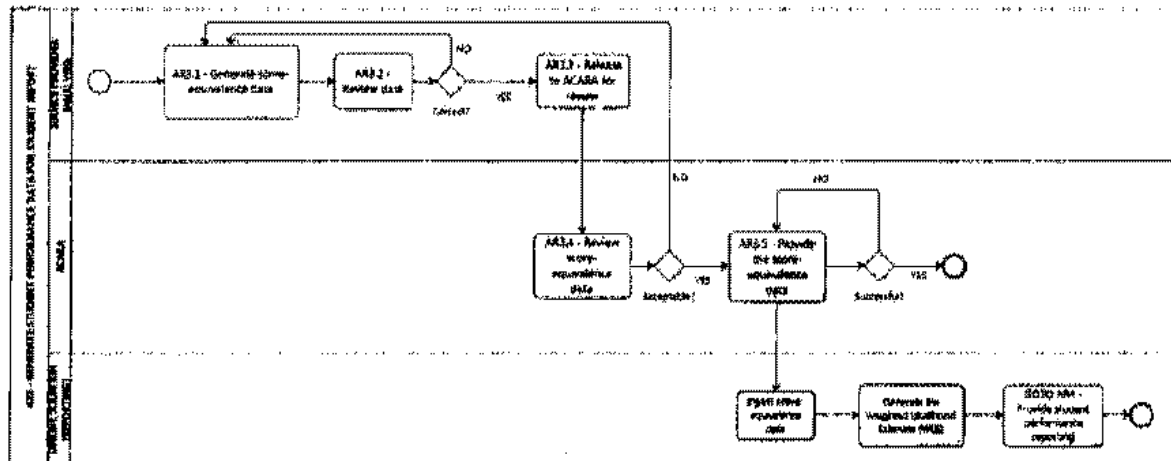
<b>Assumptions</b>	<ol style="list-style-type: none"> <li>1. That the responsible authority's authorised officers will follow the national protocols.</li> <li>2. That the responsible authority's authorised officers will access the NAP reporting data at a time of their choosing upon the data being made available.</li> <li>3. That the responsible authority's reporting requirements are defined in consultation with the system provider.</li> <li>4. That all required NAP report templates are available to the system.</li> <li>5. That NAP reporting requirements can be automated.</li> <li>6. That required data and reporting contracts are in place with each responsible authority, ie school system authorities and jurisdictional authorities.</li> </ol>
--------------------	---

Requirement ID	Requirement Description	Priority
AR2-01	The system shall provide standard reporting services (not on-demand) to NAP online users.	M
AR2-02	The system shall provide the means to download the student summary report at the school level, ensuring the correct reporting template is applied. Note: School Summary Report template will be shared in due course which will include school summary information and student information.	M
AR2-03	The system shall provide the means for the responsible authorities to download marked and scored response summary data within the boundaries of their authority.	M
AR2-04	The system shall have access to the jurisdiction authorised officer/s contact details, including email.	M
AR2-05	The system shall have access to the identity, demographic and descriptive information about individual students to enable the student reports to be produced and viewed at school level.	M
AR2-06	The system shall report on the history of change for each piece of data that makes up the national test item dataset. See Section 4 - Supporting Documents.	M
AR2-07	The system shall provide the ability for a school, jurisdictional authority and/or school system authority to access identifiable student results within a current year for immediate feedback.	M
AR2-08	The system shall provide the ability for a school, jurisdictional authority and/or school system authority to view identifiable student results across multiple assessments delivered via the platform within the same year.	M
AR2-09	An online School Summary Report, to be provided to schools immediately following the scoring and marking of students' responses.	M
AR2-10	School Summary Report shall provide reporting of student performance using scored and marked (but not yet scaled) results to an authorised user of the school.	M
AR2-11	Key elements of the School Summary Report shall be interactive. For example, a click on an item descriptor shall activate pages showing relevant sections of the Assessment Framework and exemplar items – including the image of the actual item where possible.	M
AR2-12	The format of the School Summary Report shall be designed in such a manner that shall provide feedback on student performance to schools and teachers in a way that enables teachers to identify the areas of students' learning which may require direct intervention.	M
AR2-13	The School Summary Report shall have graphical representation of students' achievement at the item level for each sub-domain, which shall incorporate unique and sufficiently detailed descriptors for each item including item's location against NAP performance bands.	M
AR2-14	The report shall have a dynamic summary of student results on items and tests at the school level, including the ability to aggregate student data at other organisation units (eg a class or a year level).	M
AR2-15	Jurisdictions shall be able to access the report once it is published online.	M

## 3.12 AR3- Generate student performance estimates

The process captures the activities required to be undertaken for student performance analysis.

### 3.12.1 Business process diagram



### 3.12.2 Business requirements

Business Requirement	
ID	AR3
Name	Generate student performance estimates
Actors	ACARA – Psychometricians Responsible Authority – Jurisdictional Officer The system (reporting)
Preconditions	<ol style="list-style-type: none"> <li>1. The scale constructions have been completed for all NAP domains and the relevant scale parameters and information has been released by ACARA.</li> <li>2. The score-equivalence table for conversion of student total number of correct items to NAP scale score (based on Weighted Likelihood Estimate (WLE) method), is ingested by the system.</li> </ol>
Post Conditions	<ol style="list-style-type: none"> <li>1. The jurisdiction – responsible authorities are able to access the scaled NAP results data for the schools within their authority.</li> </ol>
Assumptions	<ol style="list-style-type: none"> <li>1. That the jurisdiction – authorised officer/s will follow the national protocols when accessing NAP performance data.</li> <li>2. That the jurisdictions and schools will access the reporting data at a time of their choosing.</li> </ol>

Requirement ID	Requirement Description	Priority
AR3-01	The system shall have the ability to ingest the score-equivalence dataset. See Section 4 for details.	M
AR3-02	The system shall generate and store the weighted likelihood estimate of student performance on the NAP scale by correctly applying the corresponding score equivalence data.	M
AR3-03	The system shall correctly associate the student performance information with the student's NAP information.	M

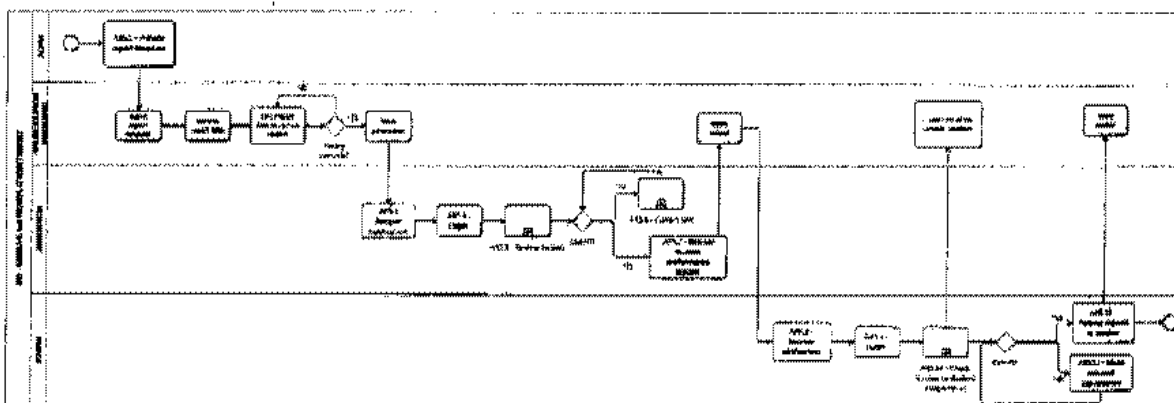


### 3.13 AR4- Provide student report and data to jurisdictions and schools

This process captures the activities required for the delivery of the NAP student performance reports ie Individual Student Report (ISR) to be made available to schools, students and parents.

The ISR will still provide scaled student results which includes the national mean. It is expected the system will enable schools and students to view it online, while jurisdictions are able to publish and disseminate the reports to the appropriate parties within their authority.

### 3.13.1 Business process diagram



### 3.13.2 Business requirements

Business Requirement	
<b>ID</b>	AR4
<b>Name</b>	Provide student performance reporting
<b>Actors</b>	ACARA – Psychometricians Responsible Authority – Jurisdictional Officer School – NAP Co-ordinator School – Teacher School – Participating Student School – Parent The system (reporting)
<b>Preconditions</b>	1. All activities within the business process AR3 have been successfully completed.
<b>Post Conditions</b>	1. The teachers are able to provide the NAP ISR with performance data to their students.
<b>Assumptions</b>	1. That the system has access to the required reporting information. 2. That all authorised users have the required access to carry-out the necessary activities. 3. That the system will provide student reports directly to an authorised person within the school as well as authorised jurisdiction users. 4. That the jurisdictions will continue to print student reports on behalf of the schools within their authority. 5. Where the NAP Co-ordinator role is assigned to a person not within the school, it is assumed that the NAP Co-ordinator has knowledge of who the performance reports need to be distributed to.

Requirement ID	Requirement Description	Priority
AR4-01	The system shall have the ability to ingest the ISR template data.	M
AR4-02	The system shall have the ability to ingest the performance report mean data.	M
AR4-03	The system shall identify and supply the correct performance data to be applied within the ISR report template.	M
AR4-04	The system shall notify authorised responsible authority users that the ISRs are now available.	M
AR4-05	The system shall enable the responsible authority to review the reporting information to ensure the correct data is related to the correct student.	M
AR4-06	The system shall enable the responsible authority to release the ISRs to the schools within their authority.	M
AR4-07	The system shall notify the school's NAP Co-ordinator that the ISRs are now available.	M
AR4-08	The system shall enable the NAP Co-ordinator to check that the school-based information is correct.	M
AR4-09	The system shall enable the NAP Co-ordinator to add, update and delete school-based information.	M
AR4-10	The system shall enable the NAP Co-ordinator to release the ISRs to the relevant teachers.	M
AR4-11	The system shall notify the relevant teachers that the ISRs are now available.	M
AR4-12	The system shall enable the teachers to view those ISRs for students within their authority.	M
AR4-13	The system shall capture all audit information related to the ISRs. For example, reports were generated correctly, sent to the correct user, etc.	M
AR4-14	The system shall provide the ability for a responsible authority to deliver NAP test results to a student.	M
AR4-15	The system shall provide the ability to deliver NAP test results to a student where the student has moved from one school to another in Australia, regardless of jurisdiction and/or school system, between sitting the assessment and delivery of the student performance report.	M

### 3.14 AR5- Generate student performance data for national reporting

This is the analytical stage where all available records will be run through external analyses which will provide the plausible values estimate of student abilities. The outcome will be a national data set which will contain the plausible values for all Australian students. The purpose of this activity is to provide TAA's with direct access to the data sets that support construction of NAP National Reports, including access to national de-identified data sets. The external analyses and construction of NAP National Reports are outside the scope of the system.

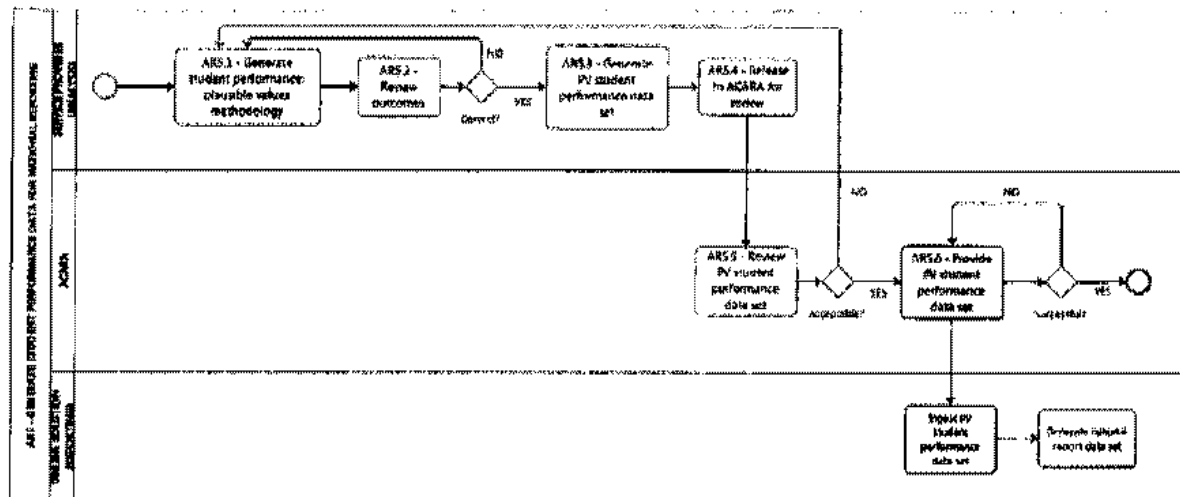
The plausible value methodology is used with the background variables being gender, LBOTE status, ATSI status, school geo-location, and school Reading weighted likelihood estimate average score. In addition, parental education and occupation have been added to the set of conditioning variables as the quality of data and response rates of these variables has improved significantly.

The five sets of plausible values are used to calculate means, standard deviations, percentiles and percentages of students within proficiency bands, for each domain and each year level at the jurisdictional and national level.

Estimates of sampling and measurement errors are combined to obtain final standard errors for the performance statistics reported for the census data. The standard errors are used to determine statistical significance in mean differences and percentage differences in NAP performance in the Reports. Equating errors are also taken into consideration, in addition to sampling and measurement errors, in the estimation

of standard errors for the determination of statistical significance in the comparisons of means and percentages between years.

### 3.14.1 Business process diagram



### 3.14.2 Business requirements

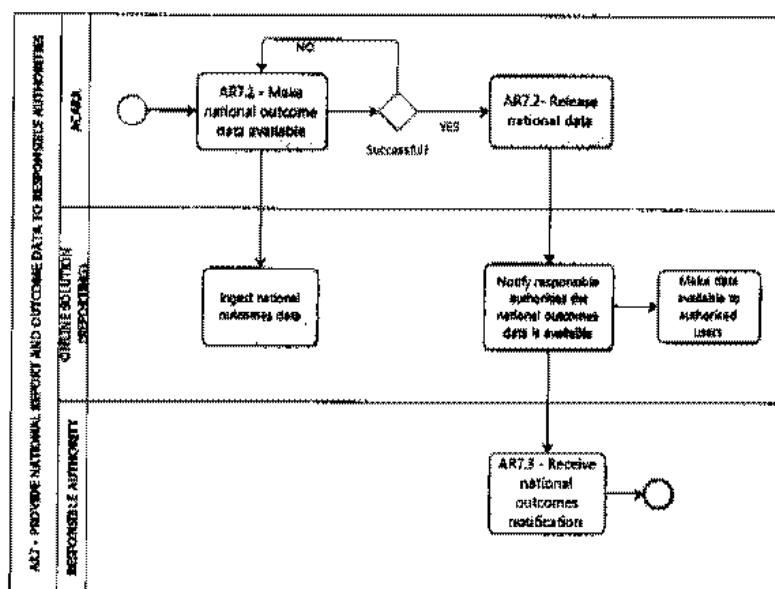
Business Requirement	
<b>ID</b>	AR5
<b>Name</b>	Generate student performance data for national reporting
<b>Actors</b>	ACARA – Psychometricians ACARA – Reviewers ACARA – Approvers Service Provider – Reporting The system (reporting)
<b>Preconditions</b>	1. All activities within the business process AR1 have been successfully completed. 2. There is a defined national NAP report dataset.
<b>Post Conditions</b>	1. All NAP national data is released for consumption by jurisdictions, school authorities and schools.
<b>Assumptions</b>	1. That the system can ingest NAP's plausible values (PV) data.

Requirement ID	Requirement Description	Priority
AR5-01	The system shall have the ability to ingest and store the set of plausible values (PV) estimates for each student.	M
AR5-02	The system shall provide a means to correctly 'merge' the PV estimates with the student's NAP information.	M
AR5-03	The system shall generate the national report dataset and make it available to authorised reporting users.	M
AR5-04	The system shall render the student performance reports in a format that prevents further manipulation.	M
AR5-05	The system shall provide similar reports for other NAP assessments as mentioned from AR5-1 to AR5-4, if required.	M

### 3.15 AR7- Provide national report and outcome data to responsible authorities

This business process captures all the activities that support the provision of national reporting, including the national outcome data for ingestion within the system.

#### 3.15.1 Business process diagram



#### 3.15.2 Business requirements

Business Requirement	
<b>ID</b>	AR7
<b>Name</b>	Provide National Reporting
<b>Actors</b>	ACARA – Psychometricians ACARA – Reviewers ACARA – Approvers Service Provider – Reporting SCSEEC Approvers The system (reporting)
<b>Preconditions</b>	1. All activities within the business process AR3 have been successfully completed. 2. There is a defined national NAP dataset. See Section 4 - Supporting Documents
<b>Post Conditions</b>	1. All NAP national data is released for consumption by jurisdictions, school authorities and schools.
<b>Assumptions</b>	1. That the system can ingest NAP national outcome data.

Requirement ID	Requirement Description	Priority
AR7-01	The system shall have the ability to ingest and securely store the national outcomes data and standard statistical data for NAP. See Section 4 - Supporting Documents for template.	M
AR7-02	The system shall make NAP's national outcomes data available as an extract to all users authorised by ACARA.	M

## 3.16 Non-functional requirements

### 3.16.1 Tenancy management

The following non-functional requirements have been identified:

Multi-tenancy is the concept of designing a system so that a common instance of it can be used by different clients as if each was running its own exclusive instance. Each of the clients is considered a tenant in the system.

The solution is designed around a similar concept of multi-tenancy with special requirements for data separation and privacy.<sup>1</sup>

Requirement ID	Requirement Description	Priority
TN-01	The system shall allow the creation and management of Tenancies.	M
TN-02	The system shall group school under a tenancy (eg under regions and dioceses) in a hierarchical manner.	M
TN-03	The system shall group tenancies to be managed by a common administrator.	M
TN-04	The system shall capture the data sharing policy for a tenancy.	M
TN-05	The system shall enable one tenancy to split its data into multiple tenancies.	M
TN-06	The system shall enable multiple tenancies to merge into one tenancy.	M
TN-07	The system shall enable one organisation (such as a region or school) to split its data into multiple organisations.	M
TN-08	The system shall enable multiple organisations to merge their data under one organisation.	M
TN-09	The system shall enable any data under one tenancy to be moved under another tenancy.	M
TN-10	The system shall enable any data under one organisation to be moved under another organisation.	M

### 3.16.2 Accessibility

Requirement ID	Requirement Description	Priority
SAC-01	The system shall be compliant with WCAG 2.0 level AA standards for all user interactions and interface designs.	M
SAC-02	The system shall have the ability to deliver different accessibility and accommodation options to individual students based on technical standards.	M
SAC-03	The system shall follow technical interoperability standards described in the Assessment Platform interoperability framework.	M
SAC-04	The system shall be covered by the Disability Discrimination Act 1992. Equal access for people with a disability is required by the Disability Discrimination Act where it can reasonably be provided.	M
SAC-05	The system shall be designed to display meaningful associated text for every graphic image.	D

---

<sup>1</sup> Please read solution architecture document for details.

SAC-06	The system shall be designed to display alternatives to image maps.	D
SAC-07	The system shall be designed to display descriptive comments for all photographic images.	D
SAC-08	The system shall be designed to display text transcriptions or descriptions for audio clips.	D
SAC-09	The system shall be designed to display alternatives to other embedded objects.	D
SAC-10	The system shall be designed to ensure that there is colour and tone contrast.	D
SAC-11	The system shall provide the ability to store accessibility information in item metadata.	M

### 3.16.3 Usability

Requirement ID	Requirement Description	Priority
USE-01	The system shall be designed to accommodate a screen resolution of at least 1024 x 768.	M
USE-02	The system shall not be built using HTML frames.	M
USE-03	The system shall permit font size to be altered by the user.	D
USE-04	The system shall provide online support and material, including contextual help, user guides, frequently asked questions and support tools for users.	M
USE-05	The system shall allow for customisation and branding of all user interfaces including by tenancy.	M
USE-06	The system shall be resilient to temporary interruptions of connectivity to user sessions.	M
USE-07	The system shall be usable from such mobile devices as iPads and tablets.	M
USE-08	The system shall offer sufficient flexibility to enable increased usability based on the user's selections or preferences.	M
USE-09	The system shall offer landing pages for registration, login, technical readiness, test entry and administration	M

### 3.16.4 Interoperability

Requirement ID	Requirement Description	Priority
INT-01	<p>The system shall support the following data model and transport model standards:</p> <p>SIF 2.x, SIF 3.x and the associated SIFAU 1.3 and SBP data model localisations, APIP/QTI 2.1, CSV and XML as mentioned in individual components.</p> <p>For further details please refer to Online National Assessment Platform interoperability framework document.</p>	M
INT-02	The system shall follow the technical interoperability standards described in the Assessment Platform Interoperability Framework.	M

INT-03	The system user interfaces must be designed to support minimum agreed device specifications such as: Windows® desktop Windows® Laptop Apple® desktop Apple® Laptop Android™ tablet / iPad® / Windows tablet Chromebook™/Chromebox™	M
INT-04	The system user interfaces shall be designed to support minimum agreed browser versions, including the following: Internet Explorer 8+ Chrome™ 21+ Firefox® 15+ Safari® 5+ Note: Where a browser version is given, all subsequent versions are included.	M

### 3.16.5 System performance

Requirement ID	Requirement Description	Priority
PRF-01	The system shall meet the performance criteria and performance levels defined in the Appendix B unless specifically mentioned. The performance levels the system is required to meet vary according to the specific type of activity and the time(s) during the year when those activities are/are not conducted.	M
PRF-02	The system shall ensure that the performance is monitored in real time and any degradation in performance.	M
PRF-03	The system will allow responsiveness, reliability and availability performance criteria to be measured by external performance measurement tools.	M
PRF-04	The system shall be able to authenticate 97% of users within two seconds per test event.	M
PRF-05	The system shall authenticate 99.99% of users within five seconds per authentication event.	M
PRF-06	The system shall provide test delivery for up to five million test sessions over a specified test period, eg four week test period.	M
PRF-07	The system shall have a response time that does not exceed two seconds 95% of the time and not exceeding five seconds 99% of the time.	M
PRF-08	The system shall not have a latency time of more than five seconds for 99% of the users during test delivery.	M
PRF-09	The system shall be able to bulk register or update one and a half million users into the system store within six hours; that is, within an overnight maintenance window.	D
PRF-10	A typical search on item metadata, paradata or psychometric data shall return all the relevant results within 3 seconds 95% of the time and not exceeding 5 seconds 99% of the time. This requirement relates to searches returning results in 'rank order' and applicable to search result set of 50000 items.	M

### 3.16.6 System availability

Requirement ID	Requirement Description	Priority
----------------	-------------------------	----------

SYA-01	The system shall meet the availability criteria described in Appendix B.	M
SYA-02	The system shall support business continuity.	M
SYA-03	The system shall support disaster recovery.	M
SYA-04	The system shall provide failover and redundancy.	M

### 3.16.7 Maintainability

Requirement ID	Requirement Description	Priority
MNT-01	No change to the software configuration shall be made without the approval of ESA.	M
MNT-02	No patch shall be applied to the underlying software product without the approval of ESA.	M
MNT-03	Any security patch shall be made available to ESA as soon as they are released.	M
MNT-04	Any security patch shall be applied within 24 hours of ESA approval.	M
MNT-05	A standard suite of tests shall be developed, run and provided to ESA to validate the system integrity after any maintenance update or system failure.	M
MNT-06	A standard suite of tests shall be developed, run, and provided to ESA to check the system readiness before a major test event.	D

### 3.16.8 Data storage

#### Assumption

These requirements may change when additional policies for archiving are established.

Requirement ID	Requirement Description	Priority
DT-01	The system shall store all data regarding item information and item performance related data according to archiving policies.	M
DT-02	The system shall comply with the Archives Act 1983.	M
DT-03	The system shall archive records according to configurable parameters.	M
DT-04	The system shall support hosting of the solution across multiple data centres across different states/territories of Australia.	M
DT-05	The system shall support database configurations designed to enable redundancy of data.	M
DT-06	Item related data and item performance data shall be contained within Australia.	M
DT-07	The system shall be able to retrieve archived records as required by the business.	M
DT-08	All students' related data shall be contained within Australia.	M
DT-09	There shall be no data movement outside Australia.	M
DT-10	The system shall provide data separation for each tenant.	M
DT-11	The system shall be able to support non-relational databases.	D



DT-12	That system shall support configurations that link a tenant's database to its own physical server instance.	M
DT-13	Data that is identified as sensitive shall be secured by using an encryption technology, both at rest and when in transit. Information Security Manual <sup>2</sup> provides detailed guidelines for the choice of encryption technologies.	M
DT-14	The system shall provide offsite data backups in a location not associated with the cloud infrastructure provider.	M

### 3.16.9 Scalability

#### Assumption

These requirements may change when policy decisions related to deployment are made.

Requirement ID	Requirement Description	Priority
SL-01	The system shall be able to scale horizontally.	M
SL-02	The system shall be capable of scaling in predefined and controllable increments.	M
SL-03	The system shall be able to scale vertically.	M
SL-04	The system shall provide the elasticity to scale back when demand drops.	M
SL-05	The system shall be able to add a new cloud processing instance automatically when the system moves from 80% of current capacity to 90% of current capacity.	M
SL-06	The system shall be able to add a new cloud database instance automatically when the system moves from 80% of current capacity to 90% of current capacity.	M
SL-07	The system shall allow the administrator to add a new cloud processing instance as required.	M
SL-08	The system shall allow the administrator to add a new database instance as required.	M
SL-09	The system shall be able to provision new database instances per tenant.	M
SL-10	The system shall be able to scale from 10,000 concurrent users to 1.5 million concurrent users.	M
SL-11	The system shall support configuration limits to provide the ability to provide five million test sessions during the two-week test period.	M

### 3.16.10 Volumetrics

Requirement ID	Requirement Description	Priority
VL-01	The system shall support generation of 1.2 million students' reports at a time.	M
VL-02	The system shall support the creation and management of an unlimited number of administrative and user accounts.	M
VL-03	The system shall support the ability to upload, store and play media files with maximum size of 300 MB for an item.	M

### 3.16.11 Deployment and hosting

<sup>2</sup> <http://www.asd.gov.au/Infosec/ism/>

### Assumption

Policy decisions regarding deployment and the development of the architecture may necessitate changes to the non-functional requirements for deployment and hosting.

Requirement ID	Requirement Description	Priority
HS-01	The system shall support a multi-tenancy model at the jurisdiction and organisation level.	M
HS-02	The system shall provide 24/7 monitoring of the environment.	M
HS-03	All hosting shall be in a secure environment and follow all security policies.	M
HS-04	The system shall have a backup and restore procedure.	M
HS-05	The system shall have a business continuity and disaster recovery procedure.	M
HS-06	The system shall support a cloud hosting model.	M
HS-07	The system shall support a hybrid hosting model (combination of cloud and private servers).	M
HS-08	The system shall not be restricted to a specific hosting provider.	M
HS-09	The system shall have the ability to migrate to a different cloud hosting provider.	M
HS-10	The hosting infrastructure shall be located in Australia.	M
HS-11	The hosting infrastructure shall be certified to support the deployed application technology stack.	M
HS-12	The system shall be able to be deployed to cloud hosting environments utilising different virtualisation stacks.	M
HS-13	The system shall be hosted on an infrastructure that has passed an IRAP assessment.	M

### 3.16.12 Security and privacy

#### Assumption

Some of these requirements may change when policy decisions are made regarding security and privacy.

Requirement ID	Requirement Description	Priority
SEC-01	The system shall comply with federal and state/territory system and information security policies and standards.	M
SEC-02	The system shall restrict access to data along jurisdictional/sector/school boundaries as required by the proposed Assessment Platform tenancy model.	M
SEC-03	The system access shall comply with existing federal and state/territory education data agreements.	M
SEC-04	The system shall comply with existing federal and state/territory information management legislation and data sovereignty requirements.	M
SEC-05	The system shall comply with all existing federal and state/territory privacy laws and principles.	M
SEC-06	The system shall comply with any privacy impact assessment recommendations required by ESA.	M
SEC-07	The system shall provide the ability to record and manage user data in line with receipt, or not, of 'informed consent' from the user.	M
SEC-08	The system shall support the recording of all identity management and access management transactions to meet compliance requirements.	M
SEC-09	The system shall support integration with third party security services and products.	M

SEC-10	The system shall support integration with third party auditing services and products.	M
SEC-11	The system shall provide item level security.	M
SEC-12	The system shall provide strong security for data at rest.	M
SEC-13	The system shall provide strong security for data in transit, including low-bandwidth scenarios.	M
SEC-14	The system and documentation shall be available to enable an audit of security.	M
SEC-15	The system infrastructure shall employ appropriate network and host security software.	M
<b>Protective Security Policy Framework compliance</b>		
PSPF-01	The system shall demonstrate compliance with the governance, personnel, physical and information security requirements in the Protective Security Policy Framework <sup>3</sup> .	M
<b>Information Security Manual compliance</b>		
ISM-01	The system shall demonstrate compliance with the requirements in the Information Security Manual <sup>4</sup> .	M
<b>Cyber Security Requirements</b>		
CYB-01	The infrastructure shall allow for application whitelisting.	M
CYB-02	All application vulnerabilities shall be patched within two days of the patch becoming available to the administrator.	M
CYB-03	All operating system vulnerabilities shall be patched within two days of the patch becoming available to the administrator.	M
CYB-04	Administrative privileges to infrastructure such as operating system and applications shall be provided on a restricted basis after following an agreed approval process.	M
CYB-05	The infrastructure shall allow for application configuration hardening such as disabling the running of internet-based Java code, untrusted Microsoft Office macros, and undesired web browser and PDF viewer features.	M
CYB-06	The infrastructure shall employ host-based Intrusion Detection/Prevention System to identify anomalous behaviour such as process injection, keystroke logging, driver loading and persistence.	D
CYB-07	The infrastructure shall not allow local administrator accounts to prevent network propagation using compromised local administration credentials that are shared by several computers.	D
CYB-08	The infrastructure shall support network segmentation and segregation into security zones to protect sensitive information and critical services such as user authentication by Microsoft Active Directory.	D
CYB-09	The system shall support Multi-factor authentication where required such as but not limited to activities like privileged action or access a sensitive information repository.	M
CYB-10	The system shall support centralised and time-synchronised logging of successful and failed computer events with automated immediate log analysis, storing logs for at least 18 months.	D
CYB-11	The infrastructure shall support web domain whitelisting.	M
CYB-12	The system shall support use of Antivirus software to proactively check any system threats.	M
CYB-13	The system shall Enforce a strong passphrase policy covering complexity, length and expiry, and avoiding both passphrase re-use and the use of a single dictionary word.	M
CYB-14	The infrastructure shall block attempts to access web sites by their IP address instead of by their domain name, eg implemented using a web proxy server, to force cyber adversaries to obtain a domain name.	D

<sup>3</sup> <http://www.protectivesecurity.gov.au/pspf/Pages/default.aspx>

<sup>4</sup> <http://www.protectivesecurity.gov.au/pspf/Pages/default.aspx>

Data encryption requirements		
DEN-01	The system shall support the use of cryptography techniques to ensure confidentiality, integrity, authentication and non-repudiation of data and information, as recommended in the ISM.	M
DEN-02	The system shall support database level data encryption.	M
DEN-03	The system shall support disk level data encryption.	M
DEN-04	The system shall support file level data encryption.	M
DEN-05	The system design shall only consider encryption products and protocols that have been approved by ASD.	M
DEN-06	The system shall use only those cryptographic algorithms that have been approved by ASD.	M
DEN-07	The system shall support transport layer security TLS 1.0 and beyond.	M

### 3.16.13 Help desk and service standards

Item	Description												
<b>Service Model</b>	<p>The following table specifies a high level a tiered service delivery model for NAP Online. A detailed support plan for NAP Online will be defined in a separate document.</p> <table><tr><th>Scope</th><th>1<sup>st</sup> Level</th><th>2<sup>nd</sup> Level</th><th>3<sup>rd</sup> Level</th></tr><tr><td>Support for IT issues</td><td>School IT Helpdesk</td><td>Jurisdiction / Sector Helpdesk</td><td>Technical Helpdesk</td></tr><tr><td>Support for test administration and invigilation issues</td><td>School Invigilators</td><td>Jurisdiction / Sector Helpdesk</td><td>ACARA NAP Online Helpdesk</td></tr></table>	Scope	1 <sup>st</sup> Level	2 <sup>nd</sup> Level	3 <sup>rd</sup> Level	Support for IT issues	School IT Helpdesk	Jurisdiction / Sector Helpdesk	Technical Helpdesk	Support for test administration and invigilation issues	School Invigilators	Jurisdiction / Sector Helpdesk	ACARA NAP Online Helpdesk
Scope	1 <sup>st</sup> Level	2 <sup>nd</sup> Level	3 <sup>rd</sup> Level										
Support for IT issues	School IT Helpdesk	Jurisdiction / Sector Helpdesk	Technical Helpdesk										
Support for test administration and invigilation issues	School Invigilators	Jurisdiction / Sector Helpdesk	ACARA NAP Online Helpdesk										
<b>Service Framework</b>	The scope and structure of Operations and Maintenance services (including Helpdesk) will be consistent with the ITIL version 3 framework.												
<b>Service Types</b>	<p>The scope of Operations and Maintenance services will incorporate the following ITIL version 3 service types:</p> <ol style="list-style-type: none"><li>1. Request Management</li><li>2. Event Management</li><li>3. Incident Management</li><li>4. Problem Management</li><li>5. Access Management</li><li>6. Change Management</li><li>7. Configuration Management</li><li>8. Release and Deployment Management</li><li>9. Capacity Management</li><li>10. Availability Management</li><li>11. IT Service Continuity Management</li></ol>												

Requirement ID	Requirement Description	Priority
HLP-01	The vendor shall provide a level 3 helpdesk function.	M
HLP-02	The vendor shall provide level 3 technical support for technical issues relating to the Assessment Platform.	M

HLP-03	The system shall meet the following draft service level targets:		M
	Service Issue Rating	Helpdesk Response	
	Critical	30 minutes	
	Major	1 hour	
	Minor	4 hours	
		Issue Resolution time targets	M
		4 hours during peak periods 12 hours during off-peak	
		90% of issues in 1 working day	
		90% of issues in 8 working days	
		1 working day	
Note: Service level terms and targets to be defined and agreed.			
HLP-04	The vendor shall track all level 3 helpdesk related issues.		M
HLP-05	The vendor shall supply training material for users.		M
HLP-06	The vendor shall provide train-the-trainer sessions to users.		M
HLP-07	The scope and structure of Operations and Maintenance services (including Helpdesk) will be consistent with the ITIL version 3 framework.		M
HLP-08	The scope of Operations and Maintenance services will incorporate the following ITIL version 3 framework service types: <ol style="list-style-type: none"> <li>1. Request Management</li> <li>2. Event Management</li> <li>3. Incident Management</li> <li>4. Problem Management</li> <li>5. Access Management</li> <li>6. Change Management</li> <li>7. Configuration Management</li> <li>8. Release and Deployment Management</li> <li>9. Capacity Management</li> <li>10. Availability Management</li> <li>11. IT Service Continuity Management</li> </ol>		M

### 3.16.14 Audit and control

Requirement ID	Requirement Description	Priority
<b>Audit Trail</b>		
AUT-01	The system shall retain records of all student responses to NAP Sample and NAP trials and assessments; it is not necessary to retain student responses to practice assessments.	M
AUT-02	The system shall retain records of all modifications to user accounts, credentials and user access privileges and data.	M
AUT-03	Every action within the system shall be fully tracked and reportable.	M
AUT-04	The system shall provide a central log server for auditing and logging purposes.	M
<b>Audit Reports</b>		
AUR-01	The system shall provide the ability to run audits of student responses for quality assurance or test incident management.	M
AUR-02	The system shall allow auditing of changes made by users to configuration items such as test items, testlets, test forms, configuration parameters and user accounts.	M
AUR-03	The system shall provide the ability to generate reports on audit data.	M

### 3.16.15 Legal and corporate

Requirement ID	Requirement Description	Priority
LC-01	The system, architecture, data transport, data storage and controls of user access to data shall comply with the Memorandum of Understanding and Data Protocols agreed between ACARA, the Australian Government, State and Territory Governments, jurisdiction authorities and school sector representative bodies.	M
LC-02	Data stored shall be managed in compliance with the <i>Australian Government Archives Act 1983</i> (Cth).	M
LC-03	The system shall facilitate compliance with National, State and Territory government privacy regulations.	M

## 4 Supporting documents

The following supporting documents provide additional information which may help to understand the system context. Some documents provide guidance as to the information that may need to be captured or provided as an output. These documents are indicative only and should not be considered as final.

Document No	Supporting Document	Description	Supported Processes
1	Item Authoring and Review System Business Requirements V1.0	This document describes requirements for the existing Item Authoring and Review system.	
2	Item Authoring and Review Workflow Guide V1.1	This document provides information about the authoring of various items and associated workflows.	
3	NAPLAN Equivalence Tables	The template in which the equivalence tables data is captured and made available to the jurisdictions.	AR2, 3, 4 and 5
4	NAPLAN's National Outcomes	The template used by service providers to record NAPLAN's national outcomes. This data is made available to the jurisdictions.	AR2 and 6
5	NAPLAN Registration Data Specification	Specifies the registration data required from schools participating in NAPLAN testing.	PTA3, TA1, MS1, AR2 and 5
6	NAPLAN Metadata Listing	Specifies the metadata to be associated with the NAPLAN test items	TD1, 2 and 3
7	NAPLAN – School Summary Report	The specification of the template for the School Summary Report.	AR2
8	NAPLAN Roles, Stakeholders and Authorisations	Specifies the roles and authorisations to be applied within the Assessment Platform.	ALL
9	NAP Sample Student Data	Specifies student data fields used by NAP Sample	

## 5 Appendices

### 5.1 Appendix A – Timeframe parameters

The following NAP timeframe parameters are to be captured for each NAPLAN main test:

Parameter	Format	Description/Permissible values
Test start date	dd-mm-yyyy	The date the NAPLAN test can begin being administered by the school.
Test end date	dd-mm-yyyy	The date the NAPLAN test needs to be completed by.
Registration start date	dd-mm-yyyy	The date the NAPLAN registration period begins for the current NAPLAN testing period.
Registration end date	dd-mm-yyyy	The date that the NAPLAN registration period ends.
Domain start date	dd-mm-yyyy	The date a specific NAPLAN domain test can begin being administered by the school.
Domain end date	dd-mm-yyyy	The date a specific NAPLAN domain test needs to be completed by.

## 5.2 Appendix B – Performance levels

Performance Levels by High Level Activity

High Level Activity	Capacity Requirement	Period of Peak Demand	During period of peak demand	Outside period of peak demand
Item authoring, item review, testlet and test development	Up to 200 concurrent users (item authors and reviewers)	Business days and hours	Silver	Silver
User familiarisation (using the practice environment)	Up to 100,000 concurrent users (test administrators and students)	School days	Bronze	Bronze
NAPLAN Item/Testlet trial	Up to 11,000 concurrent users (test administrators and students)	August	Gold	Bronze
NAPLAN full cohort assessment	Up to 1.2 million concurrent users (test administrators and students)	May	Gold	Bronze
NAP Sample assessment	Up to 20,000 concurrent users (test administrators and students)	October	Gold	Bronze

The **Gold**, **Silver** and **Bronze** performance levels are detailed in the table below. Where activity durations are specified this assumes the system user's IT environment satisfies the Assessment Platform IT standards/benchmarks (ie minimum user device specifications, Internet connectivity and data throughput / bandwidth).

Performance Level Definitions

Performance Criteria	Performance Standard	Gold	Silver	Bronze
<b>Responsiveness Criteria</b>	Low intensity activities	Less than 1 second	Less than 1 second	Less than 1 second
	Medium intensity activities	Less than 2 seconds	Less than 3 seconds	Less than 5 seconds
	High intensity activities	Less than 30 minutes	Less than 30 minutes	Less than 1 hour
<b>Reliability (Data Quality)</b>	User interface	0% data errors	0% data errors	10% data errors
	Assessment platform interface	0% data errors	0% data errors	10% data errors
<b>Availability: Maximum permissible outage duration</b>	System non-availability due to unplanned event	Less than 5 minutes per day on school days during school hours	Less than 30 minutes during any business day	Less than 1 hour during any school day
	System non-availability due to planned maintenance	Planned maintenance is not permitted on school days during school hours	Planned maintenance is not permitted during business hours	Less than 4 hours of planned maintenance during school hours per school week
<b>Business</b>	User impact	No user data must	No saved user data	User data may



<b>Continuity</b>		be lost (eg test item responses) by a fail-over or restoration event	must be lost (eg test items, testlets or tests) by a failover or restoration event	be lost as a result of an outage event (ie test item responses during User familiarisation) or No User impact outside period of peak demand (ie w.r.t. NAPLAN, NAPLAN item trial, NAP Sample)
	Data loss	No loss of data is permissible, ie user accounts or passwords, user metadata, test items, testlets, tests, student responses, scaled student results data, student metadata, item psychometric data, audit records	No loss of data is permissible, ie user accounts or passwords, user metadata, test items, testlets, tests, student responses, scaled student results data, student metadata, item psychometric data, audit records	No loss of user accounts or passwords as a result of a failover or restoration event
	Single points of failure in IT architecture	Not permissible	Not permissible	Permissible
<b>Disaster Recovery</b>	Redundancy of IT infrastructure	Logical, physical and geographic separation required	Logical, physical and geographic separation required	Redundancy is not required
	Switch-over to DR site	Automatic	Automatic	Not Applicable
	Restoration to Primary site	Automatic	Automatic or manual	Not Applicable

"Low intensity activities" implies activities with similar computer resource demands as:

1. Acknowledging a button click
2. Authenticating a user locally based on a one-time access code
3. Saving a user's response for a test item

"Medium intensity activities" implies with similar computer resource demands as:

1. Loading a landing/login web page
2. Authenticating a user remotely based on a unique username/ID and password combination
3. Loading/rendering a test item
4. Opening a test item for editing or review
5. Automatically scoring all test items in a testlet (upon user completion of the testlet)
6. Select the next testlet and load the first test item
7. Importing a single test item from an external file or item bank

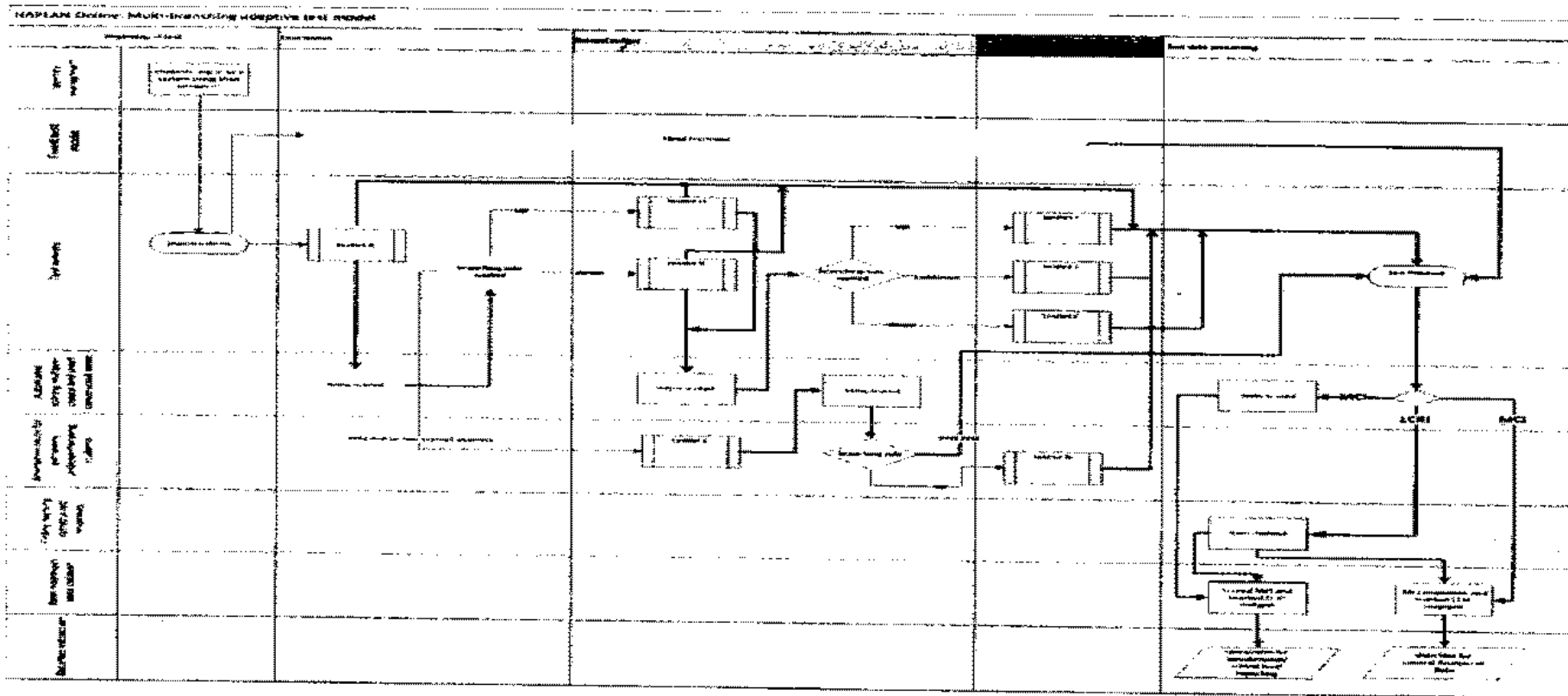
"High intensity activities" implies with similar computer resource demands as:

1. Importing test items in bulk from an external file, database or item bank
2. Exporting test items in bulk to an external file, database or item bank
3. Importing student registration data in bulk from a file, database or external IT system
4. Importing student psychometric data in bulk from a file, database or external IT system
5. Exporting student summary report data in bulk to a file, database or external IT system
6. Exporting student response data in bulk to a file, database or external IT system
7. Importing student response scaling data into the system

8. Importing test item, testlet and test psychometric performance data in bulk from a file, database or external IT system
9. Exporting scaled student results data in bulk to a file, database or external IT system
10. Generating a report on student results and rendering on-screen

### 5.3 Appendix C – Assessment delivery system process flow

Note: This draft business process map is for providing the context but that the requirements are definitive in describing what the system needs to do.



## 5.4 Appendix D – Stakeholder diagram

The following table provides a high level summary of the business processes that the various roles are involved in.

	TD2- Conduct Trialling	TD3- Construct Test	PTA2-Test Readiness at Local Level	Register for Test	Deliver Test	Post Test Admin	Mark and Score tests	Central analysis of data	Provide schools and jurisdictions summary data	Generate student reports	Student reports to jurisdictions and schools	Student perf data for national report	Provide national reporting	Provide outcome to jurisdictions
ACARA Test Manager														
Service Provider- Trialling														
Service Providers - Analysts														
ACARA Policy and Reporting														
Expert Markers														
ACARA Psychometricians														
Service Provider - Reporting														
ACARA Reviewers														
ACARA Approvers														
Expert Reviewer														
School non- teaching staff														
School Principal														



## 5.5 Appendix E - Glossary

The following is a list of terms, acronyms and abbreviations used in the NAP online project and related documentation. The terms are defined primarily for NAPLAN online test but the common terms are applicable to all the NAP assessments.

Name	Title	Meaning
<b>ACARA</b>	Australian Curriculum, Assessment and Reporting Authority	ACARA is the independent authority responsible for the development of a national curriculum, a national assessment program and a national data collection and reporting program that supports 21 <sup>st</sup> century learning for Australian students.
<b>Adjustments</b>	Accessibility adjustments aka Disability adjustments aka Personal Needs and Preferences adjustments aka Special Provisions	Adjustments to NAPLAN tests can be provided to students with specific accessibility/disability needs to support access to the tests and encourage maximum participation. These adjustments are detailed in the National Protocols for Test Administration section on the NAP website.
<b>AES</b>	Automated Essay Scoring	A program/online solution that will be used for automated marking and scoring of ExtendedText item types (essays).
<b>APIP</b>	Accessible Portable Item Protocol	APIP is based on the IMS Question and Test Interoperability (QTI) specification. The APIP Standard expands the QTI model into a comprehensive framework that encompasses the requirements for creating accessible tests. The IMS Access For All Personal Needs & Preferences (AFA PNP) v2.0 specification is also adopted as the basis for supplying the user preferences when using an APIP-enabled system. It is these accessibility preferences that are used by an assessment system to tailor, in real-time, the presentation of the question items to fit the accessibility needs of the user.
<b>Assessed</b>	Assessed students	Those students for which a NAP result is reported.
<b>Authorised officer</b>	Authorised officer from a responsible authority	A person authorised within a responsible authority to carry-out NAP processes and access NAP data for those students within the boundaries of their authority.
<b>Bank aka store</b>	Item bank aka Item store	The item bank is the repository of test items that belong to the National Assessment Program, as well as all information pertaining to those items. The items may include multiple choice, open and closed constructed response items (including writing prompts). Items are pulled from the bank and assigned to testlets as part of test construction.

<b>Branching</b>	Multi-branching test design aka Tailored test design	Ability to administer a specific testlet based on set criteria in a dynamic and/or on-demand fashion within the system.
<b>Calibration</b>	Item calibration	The process whereby items are calibrated/standardized across year levels and years to ensure consistent testing and assessment.
<b>CCR</b>	Closed constructed responses	Closed constructed response questions have only one right answer. They ask students to fill in a word, phrase or a number in a specific text and usually require only simple recall or, at best, an inference.
<b>CONQUEST</b>	Australian Council of Education Research (ACER) ConQuest	A computer program for fitting both uni-dimensional and multidimensional item response and latent regression models. It provides data analysis based on a comprehensive and flexible range of item response models (IRM), allowing examination of the properties of performance assessments, traditional assessments and rating scales. ACER ConQuest 3.0.1 also offers wider measurement and research community analysis procedures based on the most up-to-date psychometric methods of multifaceted item response models, multidimensional item response models, latent regression models and drawing plausible values.
<b>CR</b>	Constructed responses	Constructed responses are assessment items that ask students to apply knowledge, skills, and critical thinking abilities to real-world, standards-driven performance tasks.
<b>De-identified</b>	De-identified data	Data which has been stripped of all potential identifiable student information for privacy purposes.
<b>Domain</b>	Domain	A domain is the term used to describe a subject or learning area that is the focus of a test. The five learning areas tested in NAP are Reading, Writing, Spelling, Grammar and Punctuation, and Numeracy. These are called test domains. There are three domains for sample assessments: Civics and Citizenship, Information and Communications Technology Literacy and Science Literacy.
<b>Elastic scaling</b>	Elastic scaling aka Elastic computing	Elastic scaling is where a service's resources are elastic in nature, i.e. they can be easily scaled depending upon the underlying resource requirements on run time without even disrupting the operations and this ability is known as elastic computing. On a small scale this is done manually, but for larger installations, the scaling is automatic.
<b>Equating</b>	Equating	The process by which two or more tests are placed on the same measurement scale. This is so student performances and item (question) difficulties can be compared directly.

<b>Exempt</b>	Exempt students	Exempt students are not assessed and are deemed not to have met the national minimum standard. Students with a language background other than English, who arrived from overseas less than a year before the tests, and students with significant intellectual disabilities or co-existing conditions may be exempted from NAP testing. All students should have the opportunity to participate in testing, but parents of eligible students may choose for their child to be exempted. Exempted students are not included when calculating the average score for a school.
<b>ExtendedText</b>	ExtendedTextInteraction as defined by QTI v2.1	An extended text interaction is a block interaction that allows the student to enter an extended amount of text
<b>Fixed test</b>	NAPLAN Fixed Test	A test design that permits students to progress through a single path only, e.g., writing is currently a fixed test – it contains one stimulus (the prompt) and one pathway.
<b>HMQS</b>	Human Marking and Quality Assurance System	Online solution or capability within the system for managing and monitoring all human interaction in the marking and scoring process.
<b>Home group</b>	Home group aka class	Home group represents the home or main class of a student at a school.
<b>IARS</b>	Item Authoring & Review System	A program/system that can author items for use in NAP testlets or tests based on specified criteria.
<b>Identifier</b>	Student identifier	A unique identification number or code assigned to a student upon first entering or registering with their appropriate educational authority. It is used to identify the student.
<b>Identifier</b>	Item identifier aka Item code	A unique identification number or code assigned to a test item upon its first authoring or ingestion within the NAP online.
<b>IPsec</b>	Internet Protocol Security	Internet Protocol Security (IPsec) is a protocol suite for securing Internet Protocol (IP) communications by authenticating and encrypting each IP packet of a communication session. IPsec includes protocols for establishing mutual authentication between agents at the beginning of the session and negotiation of cryptographic keys to be used during the session. IPsec can be used in protecting data flows between a pair of hosts (host-to-host), between a pair of security gateways (network-to-network), or between a security gateway and a host (network-to-host).



<b>IRAP</b>	Information Security Registered Assessors Program	The Information Security Registered Assessors Program (IRAP) is governed and administered by the Australian Signals Directorate (ASD). IRAP enables ICT professionals to be engaged to conduct independent ICT assessments against Australian Government policies and guidelines.
<b>IRM</b>	Item Response Matrix aka School Summary Report	Internally known as item response matrix, otherwise known as the School Summary Report, this is the first report to go to schools' after all students have sat exams. It is a summary of how each student performed in each domain. The report is based on the raw results and has not had any scaling, calibrating or equating for national comparison.
<b>ISR</b>	Individual Student Report	NAP student performance reports made available to schools on the completion of the online test event.
<b>ITIL</b>	Information Technology Infrastructure Library	The Information Technology Infrastructure Library (ITIL) is a set of practices for IT service management (ITSM) that focuses on aligning IT services with the needs of business.
<b>Jurisdiction</b>	Jurisdiction	A state or territory in Australia. Test Administration Authorities (TAAs) from each jurisdiction are responsible for the implementation and administration of the NAP tests in their jurisdiction (e.g., New South Wales, Northern Territory, Tasmania etc.)
<b>LBOTE</b>	Language Background Other Than English	A student is identified as having a LBOTE if either the student, or the student's parents or carers, speaks a language other than English at home. The LBOTE percentage reported on the My School website reports those LBOTE students who sat NAP tests in the selected calendar year.
<b>Link Items</b>	Link items aka Common items	Questions that appear in more than one test. Having link items is one method of equating tests. Link items can be 'vertical' (e.g. having common items in NAPLAN 2010 Reading Year 3 and NAPLAN 2010 Reading Year 5 tests), or 'horizontal' (e.g. having common items in tests administered in different calendar years).
<b>Marking</b>	Manual marking	Where qualified markers are employed to evaluate and score students' NAP test responses.
<b>MCM</b>	Multiple-choice multiple selection	Multiple-choice is a form of assessment in which respondents are asked to select the best possible answers out of the choices from a list.
<b>MCS</b>	Multiple-choice single selection	Multiple-choice is a form of assessment in which respondents are asked to select the best possible answer out of the choices from a list.

<b>Metadata</b>	Metadata	A set of data that describes and gives information about other data. For example the following metadata is required to be captured with the numeracy test item: Item ID, content strand, proficiency strand, predicted difficulty at each intended year level, intended testlet at each year level, calculator status, key (will be in a different format depending on item type), item descriptor, process category (knowing, applying, and reasoning); item type (multiple-choice, constructed response); Contextual information – problem scenarios, explanations, instructions and background text; calculator status (inactive, neutral – non-calculator, neutral – calculator, inactive).
<b>Multistage adaptive test design</b>	Also known as Tailored Test Design	Multistage adaptive test design (the 'tailored test design') is where the test difficulty is adjusted to students' needs. After students respond to a set of test items, they are provided with a subsequent set of items that best suits their observed ability (i.e. achievement level). In the proposed tailored test design, students go through three stages containing item sets (testlets) of varying difficulties to complete the test.
<b>NAP</b>	National assessment framework	A clear definition of the scope and method of testing in each of the three areas/domains included in the NAP Sample Assessments.
<b>NAP</b>	National Assessment Program	National Assessment Program – the NAP comprises a suite of national and international assessments which provide nationally comparable data on student achievement in literacy, numeracy, science, civics and citizenship and ICT.
<b>NAPLAN</b>	National Assessment Program – Literacy and Numeracy	NAPLAN stands for the National Assessment Program – Literacy and Numeracy. NAPLAN is a series of common literacy and numeracy tests conducted annually across Australia for all students in Years 3, 5, 7 and 9.
<b>National exception management</b>	Exception management aka Exception and Anomalies management	The management of exceptions by TAAs and schools, prior, during and after the NAPLAN test period.
<b>National report</b>	National Report (including state and territory)	The annual NAPLAN National Report is a report of the national analysis of NAPLAN results. This report shows NAPLAN results at each year level and domain by state and territory and nationally. It also includes final NAPLAN results by gender, indigenous status, language background other than English status, parental occupation, parental education, and location (metropolitan, provincial, remote and very remote) at each year level and for each domain of the test.

<b>Non-teaching staff</b>	Non-teaching staff	A member of the school who supports the school by providing educational services but does not directly teach students. Non-teaching staff can be engaged at one or more schools and include specialist support staff such as counsellors, teachers' aides and assistants, administrative and clerical staff, and building operations, general maintenance and other service staff. For government schools, this information is provided by the school State or Territory jurisdiction.
<b>Online</b>	Online	The term online is used throughout to refer to the delivery of a test electronically, on screen. For the great majority of schools this will be through web based delivery. For a small number of schools, alternate technology may be used to overcome connectivity or other technical issues. For the purposes of this project, the term online will refer to all modes of electronic, on-screen delivery.
<b>Participation</b>	Participation	In NAP tests, participation rates are calculated as all assessed and exempt students as a percentage of the total number of students in the year level, as reported by schools, which includes those absent and withdrawn.
<b>Prompt</b>	Writing Prompt aka Writing test item	The stimulus provided in the Writing test. The writing prompt consists of the text that contains the topic (for Persuasive) or idea (for Narrative) that must be written about. It may or may not also have some additional text support to elaborate on, or explain the topic/idea. Additionally, the writing prompt gives student guidance around the expected structure of their response (introduction, body, conclusion for Persuasive, and orientation complication and resolution for Narrative) and provides information about what is important in the assessment – sentences (grammar) punctuation, spelling, word choice, paragraphs.
<b>Psychometrician</b>	Psychometrician	A Psychometrician is a person practising any or all aspects of Psychometrics. Psychometrics is an area of statistics concerned with educational and psychological measurement. This includes the construction of tests, construction of measurement scales and the development and refinement of theoretical approaches to measurement.
<b>PV</b>	Plausible values	Plausible values are set of student ability estimates derived from the measurement model implemented in NAPLAN and expressed in NAPLAN scale scores. Plausible values estimates are used in construction national reports and are not used in reporting of individual student results.
<b>QTI</b>	Question and Test Interoperability	Question and Test Interoperability (v 2.1) – a specification standard that defines a standard format for the representation of item content and results supporting the exchange of this material between authoring and delivery systems.

		repositories and other learning management systems.
<b>Raw data</b>	Raw data	Data that has not been subjected to processing or any other manipulation such as scaling, calibrating, cleaning etc. – i.e. student responses collected immediately after the response has been made.
<b>Readiness</b>	Readiness – School	A school has confirmed that they are "test-ready" (compliant with policy, able to meet technical and administrative requirements, staff trained, students familiarised, etc.).
<b>Responsible authority(ies)</b>	Responsible Authority(ies)	The jurisdictional authority, school system authorities (government, Catholic and independent), aggregations of schools and the individual school within the boundaries of a state or territory.
<b>Reviewer</b>	Reviewer aka Expert Reviewer	A person identified and/or accepted by ACARA as being an expert and/or of a sufficient knowledge and experience level to be authorised as a reviewer for NAPLAN testing.
<b>Rubric</b>	Marking rubric	The marking rubric is the set of criteria against which the test is assessed.
<b>Sample assessment</b>	National sample assessment	Three-yearly national assessments involving samples of schools and students, in the areas of science literacy (Year 6), civics and citizenship (Years 6 and 10) and ICT literacy (also Years 6 and 10).
<b>Scale</b>	Assessment scale	Each of the NAPLAN assessment scales describes the development of student achievement in a domain from Year 3 through to Year 9, along a ten-band scale. By locating all student results on a single scale that describes their performance and skills, the NAPLAN assessment scales provide significant information about the performance of students.

<b>Scaled score</b>	<b>Scaled score</b>	<p>NAPLAN scale scores enable students' results to be compared directly, irrespective of year group and calendar year of testing (subject to some measurement error). For example, a score in Reading of 700 in Year 5 in 2012 is comparable to a score in Reading of 700 in Year 7 in 2013 (even though the year group and calendar year of testing were different). NAPLAN scale scores are only comparable within the same domain (e.g. 'Reading', 'Numeracy' etc.).</p> <p>NAPLAN scale scores take into account the relative difficulties of different tests and the abilities of students. They are obtained by a process of equating different tests in the same calendar year and domain (e.g. Numeracy in 2013) and then by equating these results with a special equating test, which essentially places the results for the current year of testing onto the same 'historic' NAPLAN scale.</p> <p>Because NAPLAN scale scores are comparable within each domain regardless of year group or calendar year of testing, they can be used to track students' progress over time.</p>
<b>Scored</b>	<b>Marked scores</b>	The raw scores of student's NAPLAN test responses, ie no scaling have been applied.
<b>Scores</b>	<b>Scores</b>	NAP test results are reported both as direct scores and in bands or levels. The common NAPLAN scale for Years 3 to 9 ranges is from 0 to 1000 score points.
<b>Scoring</b>	<b>Automated scoring</b>	Where a technology program evaluates and scores students' NAPLAN test responses.
<b>Scripts</b>	<b>Scripts</b>	Student response to writing prompts and essays.
<b>Sector</b>	<b>School sector aka school system</b>	There are two (2) school sectors in Australia – government and non-government. Schools may also belong to a school system (eg the government school system in each State and Territory or a Catholic school system in a particular State) or operate independently of any school system. Additional information on the affiliation of non-government schools may be available in the 'School comments' provided by the school.
<b>Security</b>	<b>Test security</b>	Those security measures in place around the administration, delivery and marking of the test which assist in maintaining test integrity.

<b>SIF</b>	Schools Interoperability Framework	<p>The Schools Interoperability Framework (SIF) is not a product, but a technical blueprint for enabling diverse applications to interact and share data related to entities in the PK-12 instructional and administrative environment. SIF is designed to:</p> <ul style="list-style-type: none"> <li>· Facilitate data sharing and reporting between applications without incurring expensive customer development costs;</li> <li>· Enhance product functionality efficiently; and</li> <li>· Provide best-of-breed solutions to customers easily and seamlessly.</li> </ul>
<b>Sign-in</b>	Sign-in aka sign-on, login	A method that allows a NAPLAN-associated user (eg students, persons assigned a NAPLAN testing role, Principals, etc.) to access the NAPLAN tests when and as required.
<b>Stem</b>	Item stem	The stem is the beginning part of the item that presents the question asked of the respondent, or an incomplete statement to be completed.
<b>Stimulus</b>	Stimulus	Any supplementary text, graphic, video and audio, or combination thereof associated with an item to assist a student when responding to an item or item set, for example, to assist a student with responding to an item in the Reading Test.
<b>Strand</b>	Strand	A strand is an embodiment of an area of learning and development. Strands are units that outline the knowledge that a student needs to acquire and these units provide context within which students will develop a particular skill and concept.
<b>TAA</b>	Test Administration Authority aka Testing authority	State-based organisations charged for administering NAPLAN tests for government, Catholic and independent schools within their jurisdictional authority.
<b>Test author</b>	Test Author aka Author	A person authorised to develop a NAPLAN testlet, fixed test and/or main test within the Assessment Platform.
<b>Test experience</b>	Student Test Experience	An indicator of whether the student was subject to any exceptions and anomalies during NAPLAN testing. Where a student is subject to an exception their test response has a status of 'non-standard'. Conversely, where a student is not subject to an exception their test response has a status of 'standard'. Exceptions can be caused by service interruptions.
<b>Test group</b>	Test Group	A designation of a group of students assigned to a specific NAPLAN test. Test groups allow the school to assign students and test administration staff to specific 'groups' for the NAPLAN testing domains. A student can be allocated to a different test group for each NAPLAN testing domain

<b>Test item</b>	Item aka Test item	A test item is a test question (or part of a question). Test items can be: 1. Multiple choice, or 2. Constructed responses - long, short, polytomous or dichotomous, open or closed
<b>Test manager</b>	Test manager	A person that is employed by ACARA to manage the NAPLAN tests for a specific domain, ie Test Manager – Numeracy.
<b>Testlet</b>	Testlet	A standalone set of test items which has a predefined range of measurement properties and/or assessed skills coverage that are used by the NAPLAN tailored, multi-staged test design.
<b>Training sample</b>	Training sample	The training sample is intended to represent the breadth of responses at each score point and is used to set the scoring engine parameters.
<b>Trialling</b>	Trial test	Trialling of NAPLAN items/testlets, etc., prior to the main test for appropriateness, quality assurance, item performance statistics and determination of use in the main test.
<b>User/s</b>	Assessment delivery system user/s	A user is anyone who accesses the Assessment Delivery system through a user name and password.  Note: This excludes students as they access the system through a unique access code
<b>Withdrawn</b>	Withdrawn	Students withdrawn by their parents from NAPLAN testing.



Education  
Services  
Australia

## Online National Assessment Platform

### Solution Architecture

Prepared by Education Services Australia

Version 1.0

January 2015



# Contents

<b>Glossary</b>	<b>iii</b>
<b>1 Introduction</b>	<b>1</b>
1.1 Project background	1
1.2 Document purpose	1
1.3 Business objectives	2
1.4 Principles	2
1.5 Assumptions	3
1.6 References	3
<b>2 Overview</b>	<b>4</b>
<b>3 Architecture principles</b>	<b>5</b>
<b>4 Architecture constraints</b>	<b>7</b>
4.1 Standards for Interoperability	7
4.2 Data storage requirements	7
4.3 Support for multiple deployment environments	7
<b>5 High-level architecture</b>	<b>8</b>
5.1 System view	8
5.1.1 System cooperation	11
5.2 Item authoring and review system	13
5.3 Assessment delivery system	13
5.3.1 Components of Assessment delivery system	13
5.3.2 Sub-components of registration and administration	16
5.3.3 Sub-components of scoring	16
5.3.4 Sub-components of online delivery and presentation	17
5.3.5 Sub-components of offline and low bandwidth delivery and presentation	17
5.3.6 Sub-components of test creation and management	18
5.3.7 Sub-components of reporting	18
5.3.8 Sub-components of system services management	18
5.4 Longitudinal data store	20
5.5 Registration and Access	20
5.6 Automated Essay Scoring	20
5.7 Connections to External systems	21
<b>6 Tenancy architecture</b>	<b>22</b>
6.1 Tenancy architecture layers	23
6.2 Sample configurations of tenancy model	23
6.3 Example implementation of agreements	26
6.4 Data separation	28
<b>7 Data Architecture</b>	<b>30</b>
7.1 Data Management Principles	30
7.2 Data Flow	31

7.3	Data Model.....	33
7.3.1	Conceptual data model for Tests.....	33
7.3.2	Conceptual data model for assessment delivery.....	34
7.3.3	Conceptual data model for reporting on assessment events.....	37
7.3.4	Conceptual data model for user management and registration.....	38
7.4	Data Security.....	39
7.5	Data Encryption.....	39
7.6	Data Quality.....	40
7.7	Data Backups.....	41
7.8	Database considerations.....	42
8	Security.....	43
9	Technical concepts specific to the Assessment Platform.....	46
9.1	Linking to the learning data stores.....	46
9.2	Offline and low bandwidth delivery.....	47
9.3	Training environment (sandbox).....	47
10	Design and development guidelines.....	48
11	Deployment and hosting guidelines.....	52
11.1	Deployment scenario 1 – fully online.....	53
11.2	Deployment scenario 2.1 – cached at school LAN.....	55
11.3	Deployment scenario 2.2 – local test server.....	57
11.4	Deployment scenario 2.3 – offline (USB).....	58
11.5	Deployment scenario 3 – pre-installed on PC or tablet.....	59
12	Environments.....	60

## Glossary

Term	Definition
ACARA	Australian Curriculum, Assessment and Reporting Authority
Accessibility	Accessibility refers to making web content more accessible to people with disabilities. Accessibility involves a wide range of disabilities, including visual, auditory, physical, speech, cognitive, language, learning, and neurological disabilities. Although these guidelines cover a wide range of issues, they are not able to address the needs of people with all types, degrees, and combinations of disability <sup>1</sup>
Adaptive assessment	Provides the ability for an assessment to adjust based on a student's responses. This can be done on an item-by-item basis (linear) or on a testlet basis (staged)
AES	Automated Essay Scoring. Marking that occurs by a computer and is typically used in essays or extended responses
API	Application Programming Interface is a set of routines, protocols, and tools for building software applications.
Authentication	Verification by the system that you are who you say you are
Authorisation	Defines what the specific user can do within the system
Department of Education	Australian Government Department of Education
Diagnostic assessment	Given at set increments throughout a period of time to determine the progress of a student's learning and identification of areas of weakness and strengths. These assessments also provide insight into a student's misconceptions of concepts. The results from these assessments can then be used in instructional planning
Distributed scoring	Scoring that occurs by sending responses to be marked by persons at set locations. Marks are recorded and then used for scoring
ESA	Education Services Australia
Formative assessment	Used with students, usually informally, in order to modify teaching and learning activities to increase understanding of concepts. The information is typically qualitative and used by students and teachers for greater learning
ICT	Information and Communications Technology
Item	A test question that contains one or more interactions with response data collected as a result of the interaction. An item should contain its own, unique prompt. It could have its own stimulus, and/or share a stimulus with other items

<sup>1</sup> <http://www.w3.org/TR/WCAG20/>

Term	Definition
Item bank	A repository of items used for assessments. More than one item bank can be used in an assessment system; however, one should be the authoritative source
Jurisdiction	For the purposes of this document, jurisdiction may refer to either the state/territory or the school sector (government, independent or Catholic)
Longitudinal	For the purposes of this document, longitudinal refers to tracking the same type of information on the same subjects at multiple points in time. It is used for measuring change. These data and information can be focused on cohorts, assessments or any other data desired to be tracked to make data-informed decisions
Master data management	Involves determining the processes, governance, standards, policies and data of an organisation and/or applications
NAP-CC	National Assessment Program Civics and Citizenship
Psychometrician	An individual who studies and practices the measurement of the knowledge, skills and abilities of others. In assessment, this individual ensures that items and assessments are created according to the constructs and frameworks desired to be measured as well as reviewing data to ensure that items and assessments are performing as expected
QTI	Question and Test Interoperability (v 2.1) – a specification standard that defines a standard format for the representation of item content and results
REST	Representational State Transfer. Is a simple stateless architecture that generally runs over HTTP.
SIF	Systems Interoperability Framework, is an open, industry supported standard used to link together data systems within the school sector. SIF is well established in the US, the UK and Australia.
SIS	Student Information System
SSO	Single sign-on
Summative assessment	Measures a student's understanding at a given point such as the end of a course or year. These tests are scored and used for more formal purposes such as accountability or marks
TAA	Test Administration Authority
TEI	Technology-enhanced item
Test bank	A repository of created tests that can be delivered to students
Testlet	A smaller portion of the overall assessment. Numerous testlets make up one assessment. Each testlet measures different constructs. In an adaptive assessment, different testlets are provided based on previous responses to items
TLS	Transport Security Layer. Is a protocol that ensures privacy between communicating applications and their users on the Internet.

Term	Definition
ZIS	Zone Integration Server

# 1 Introduction

## 1.1 Project background

Australian education authorities recognise the importance of quality assessment and timely feedback in improving student achievement. Quality assessments delivering valid and reliable data are critical accountability tools for education authorities in their efforts to improve performance. Quality assessment tools are also important for teachers to support tailored student learning and reduce performance gaps associated with disadvantage.

The Australian Government Department of Education is funding Education Services Australia (ESA) to develop the Online National Assessment Platform ('the Assessment Platform') as part of a broader program of work that supports a range of assessment types including national online assessment.

This includes supporting the Australian Curriculum Assessment and Reporting Authority (ACARA) in delivering the National Assessment Program (NAP), and in particular, the NAP of sample assessments in science literacy, civics and citizenship and information and communication technology and the National Assessment Program for Literacy and Numeracy (NAPLAN), including related trialing and research assessments.

The Assessment Platform would also have the potential to deliver jurisdictional assessment programs and systemic and classroom based assessments in the future.

The program is being delivered in partnership with ACARA, Education Services Australia (ESA) and the National Schools Interoperability Program (NSIP), with each responsible for delivering interrelated aspects.

ACARA is undertaking the item and test development and reporting aspects of the program, including designing tests, developing test items and undertaking and reporting on research into the impacts of online test delivery.

ESA is responsible for supplying the information technology systems to deliver assessments and surveys online. ESA is also responsible for the delivery of the technical services for the Assessment Platform.

NSIP is providing advice on interoperability and identity management between state and territory systems and the central system.

## 1.2 Document purpose

This document describes the solution architecture and key development guidelines for the Assessment Platform.

The Assessment Platform is designed to provide services for the entire assessment lifecycle.

The diagram below details the overarching assessment processes and sub-processes for the assessment lifecycle. The Assessment Platform meets the requirements of these processes and sub-processes.

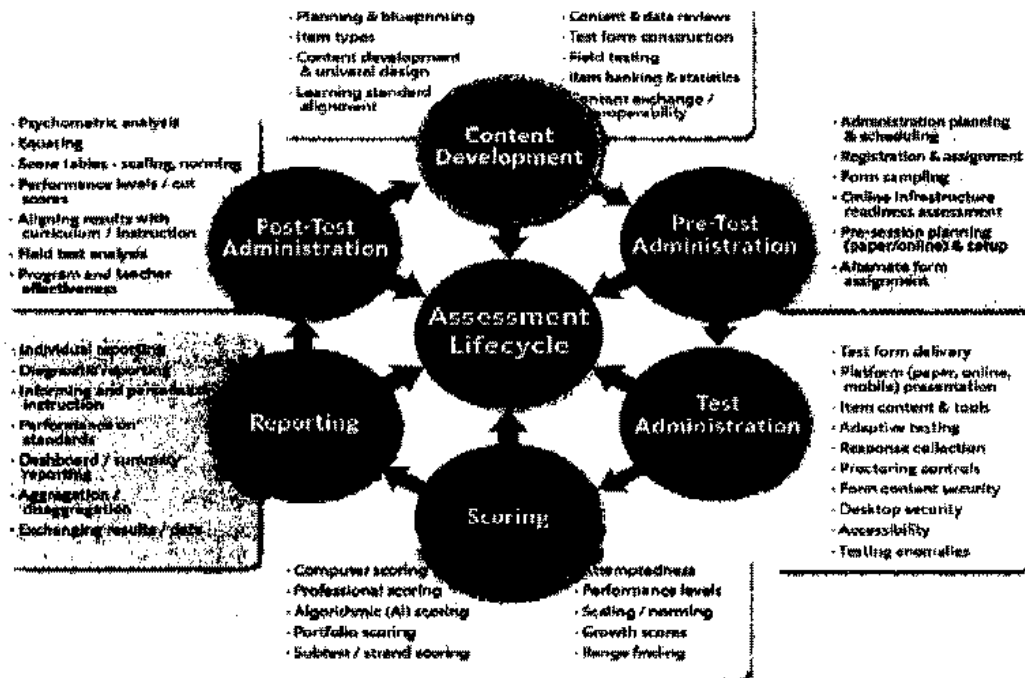


Diagram 1: Assessment Lifecycle, © SIF Association

### 1.3 Business objectives

In order to support an Assessment Platform, several business objectives emerge. These objectives are centred around the development of:

- an item authoring and review system
- an assessment delivery system
- an assessment marking system (marking, analysis and psychometrics)
- an assessment results and reporting component of the assessment delivery system (data warehouse, results, analytics and psychometrics)
- an interoperability solution for all systems, including integrating with school, jurisdiction, national, test administration authority (TAA) and other agencies for the format and transport of data (data warehouses, student information systems, reporting systems and others)

### 1.4 Principles

The following principles serve as the foundation for the Assessment Platform. These principles underpin the vision, business requirements and direction. The Assessment Platform will:

- add value to, improve and drive teaching and learning, affording opportunities to personalise learning for all students
- provide optimal flexibility for multiple users
- enable and support the assessment lifecycle

- deliver useful information for decision-making purposes
- support improvement in student learning outcomes
- create an enterprise approach to assessments in order for the assessments to be valid, expandable, reliable, scalable and fair
- reflect the agreed teaching and school leadership standards
- drive and demonstrate innovation in assessments and the use of ICT.

## 1.5 Assumptions

The document should only be used as a reference for understanding the Assessment Platform at a higher level. A more detailed architecture will be developed by the vendor when specific products have been identified for the various components. The data models have been intentionally kept simple at this stage and are to be used only to understand the system concepts. They will be elaborated and finalised in the later stages of the project.

## 1.6 References

- Assessment Delivery System Business Requirements
- Assessment Platform Interoperability framework
- Assessment Platform Concept of Operations



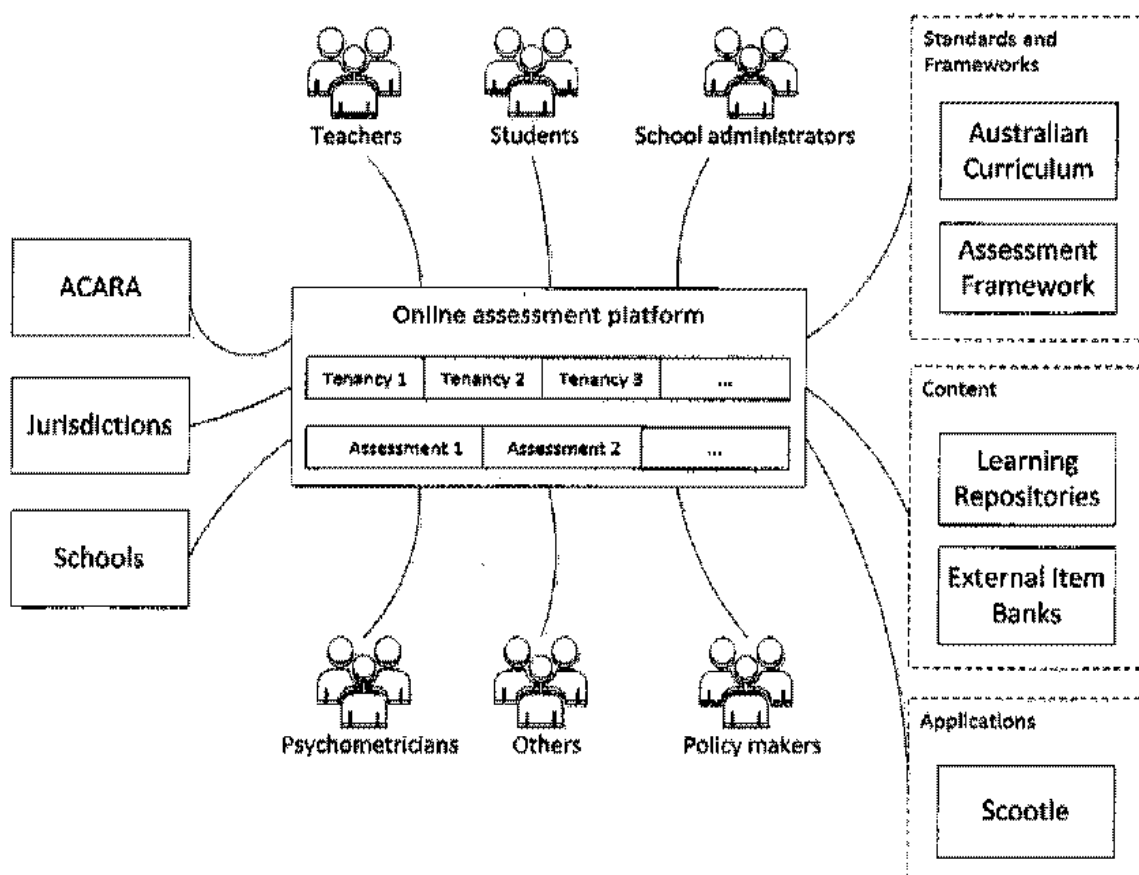
## 2 Overview

The Assessment Platform will operate in an educational technology landscape where it needs to work closely with other systems to fully leverage the benefits of all systems.

The Assessment Platform targets a user community comprising of teachers, students, school administrators, psychometricians, policymakers and education specialists in organisations such as ACARA and the Department of Education. It is expected that the Assessment Platform will deliver process improvements, enable improved and faster assessments, and facilitate individual student progress.

Education Services Australia has previously built online systems related to learning standards, curriculum frameworks and educational content sharing. The Assessment Platform is expected to support and work closely with existing initiatives.

The following diagram illustrates the landscape in which the Assessment Platform will operate.



**Diagram 2: Online National Assessment Platform - system context**

The remainder of this document builds on and provides further details of the system context.

### 3 Architecture principles

The architecture principles are the overall guidelines that are used during the design process. A set of sound architecture principles will assist with selection of the best option.

Principle	Rationale	Implication
Optimal allocation of content and resources	Required to ensure a consistently high level of performance	Systems architecture should use mechanisms such as caching at different layers and must allow the topology of services to be modified, to rebalance or optimise the assignment of resources to servers and hosts.
Separation of identity and data domains	Allows independent evolution and change of clients and services over time	Systems architecture should support an appropriate degree of separation of identity and data domains, so that clients and the services they use are suitably loosely-coupled.
Services orientation	Allows system capabilities to be reused in a different context	Systems architecture should support services-oriented and component-based software architectures to be designed, deployed and managed.
Scalable design	Required to meet varying demands on the system at different points in time	Systems architecture should support the business requirements for performance, and must be capable of being scaled horizontally as well as vertically when the user base expands.
Compliance with industry standards and interoperability	Ensures that dependencies (between components and also between the architecture and vendors' products) are minimised	Wherever possible, an industry standard protocol, interoperability framework or component must be used.
Accessibility	Core design principle to ensure that a satisfying experience is provided to all users	System components should use standards such as the Accessible Portable Item Protocol (and by extension QTI 2.1) to enable accessibility for the platform.

Principle	Rationale	Implication
Data security and encryption	As the system will handle sensitive data such as student identification, assessments and results, it is critical that thorough security and encryption policies and standards are applied to data at every step of its lifecycle	The system must comply with the agreed upon data security and encryption standards. Technologies that can be considered include Hypertext Transfer Protocol Secure (HTTPS), Transport Layer Security/Secure Sockets Layer (TLS/SSL), disk encryption, digital signatures and data encryption.

## **4 Architecture constraints**

Architecture constraints include any factors that limit design choices.

### **4.1 Standards for interoperability**

The choice of technology can be limited by the interoperability standards to which the application components must adhere. This will also limit the components that can be used to provide the Assessment Platform.

### **4.2 Data storage requirements**

Data storage requirements arising out of legislation or jurisdictional policies can impact heavily on the design for the Assessment Platform. Primarily, this impacts the way in which data can be stored. All components must therefore factor in multi-tenancy with a focus on data separation.

### **4.3 Support for multiple deployment environments**

The system must support deployment in a range of environments such as low bandwidth and offline. Every component must therefore include the ability to enable offline or low bandwidth deployment.

## 5 High-level architecture

This section describes the high level architecture of the Assessment Platform, with a focus on the assessment delivery system.

### 5.1 System view

The following diagram illustrates the high-level system divisions of the Assessment Platform. Please note that while the assessment delivery system can work with other systems such as Registration and Access, it can also meet several business requirements through its own User Management and Reporting components.

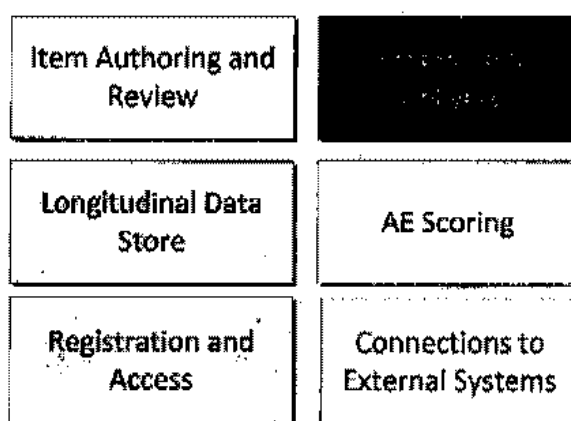


Diagram 3: High-level system divisions

The platform is divided into the following top-level divisions.

#### Assessment delivery system

The assessment delivery system is responsible for the management of the entire test delivery lifecycle. This system enables delivery of tests to the students and manages the logistics of assigning students to tests and assigning invigilators to test sessions. The offline delivery management system allows for assessments to be conducted in low bandwidth and no bandwidth environments.

#### Item authoring and review system

The item authoring and review system is responsible for creation and management of items and their related workflows. This system provides the content that is used by the assessment delivery system.

#### Longitudinal data store

The longitudinal data store is responsible for storing the assessment data after an assessment event has completed, so that it can be used for longitudinal reporting in future.

### **Automated essay scoring system**

The automated essay (AE) scoring system is responsible for providing scores for the responses to questions marked for automated scoring. The system works with assessment delivery systems and complements its scoring Assessment Platform.

### **Registration and access system**

The central registration and access system is responsible for provisioning users, managing identifiers and ensuring correct user access to various components.

### **Connections to external systems**

External systems include all systems that either feed data to the Assessment Platform or receive data from the Assessment Platform.

The following diagram illustrates the high level architecture of the platform and how the various systems connect together.

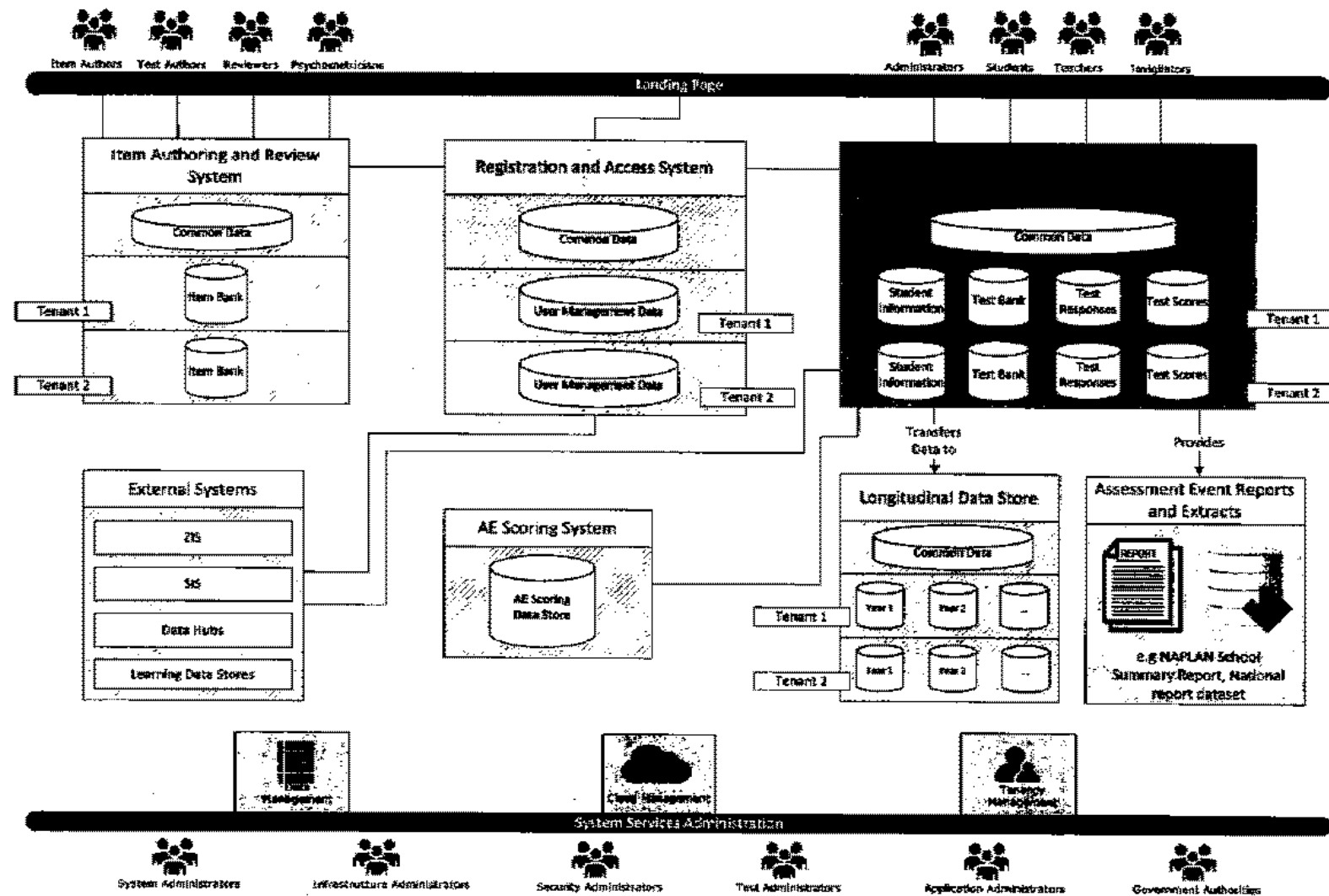


Diagram 4: High-level architecture of the Assessment Platform

### 5.1.1 System cooperation

As seen in the diagram, all users other than service administrators interact with the platform through an appropriate landing page. Users at a high level include item authors, test authors and reviewers, students, teachers, invigilators and administrators at various levels. The registration and access system is responsible for managing the authentication of all users. If a registration and access system is not in operation the assessment delivery system will authenticate the users.

Item authors log into the system and create items in the item authoring and review system. These items are reviewed and moved to the item bank when published. Test authors then use these items to create tests which, after review, are moved to a test bank in the form of a test package.

Administrators log into the system and create test events in the assessment delivery system. Administrators such as the NAPLAN coordinator can also view and edit student information through the delivery system. Test events flow into the system from agency level to school level. The NAPLAN coordinator then assigns students and invigilators to a test event. At the end of the assessment event, the reporting component of the assessment delivery system provides a number of assessment event related reports and extracts such as NAPLAN School Summary report and National report dataset.

Along with providing the assessment event reports and extracts the assessment delivery system moves assessment data at the end of the cycle to a longitudinal data store. The longitudinal data store can be thought of as a data warehouse that can be leveraged to provide longitudinal reporting in future.

The service administrator logs into the system through the system services management console. System services are broadly classified into data management, tenancy management and cloud management. The tenancy management component is responsible for creating tenancies in the delivery system and ensuring separation of jurisdictional data. The cloud management component is responsible for managing the entire cloud-based infrastructure via monitoring of events on a 24/7 basis, and scaling out and back in response to changes in demand. The data management component is responsible for data backups and archiving.

The various components of the assessment delivery system and its interaction with other systems is shown in diagram 5 below.



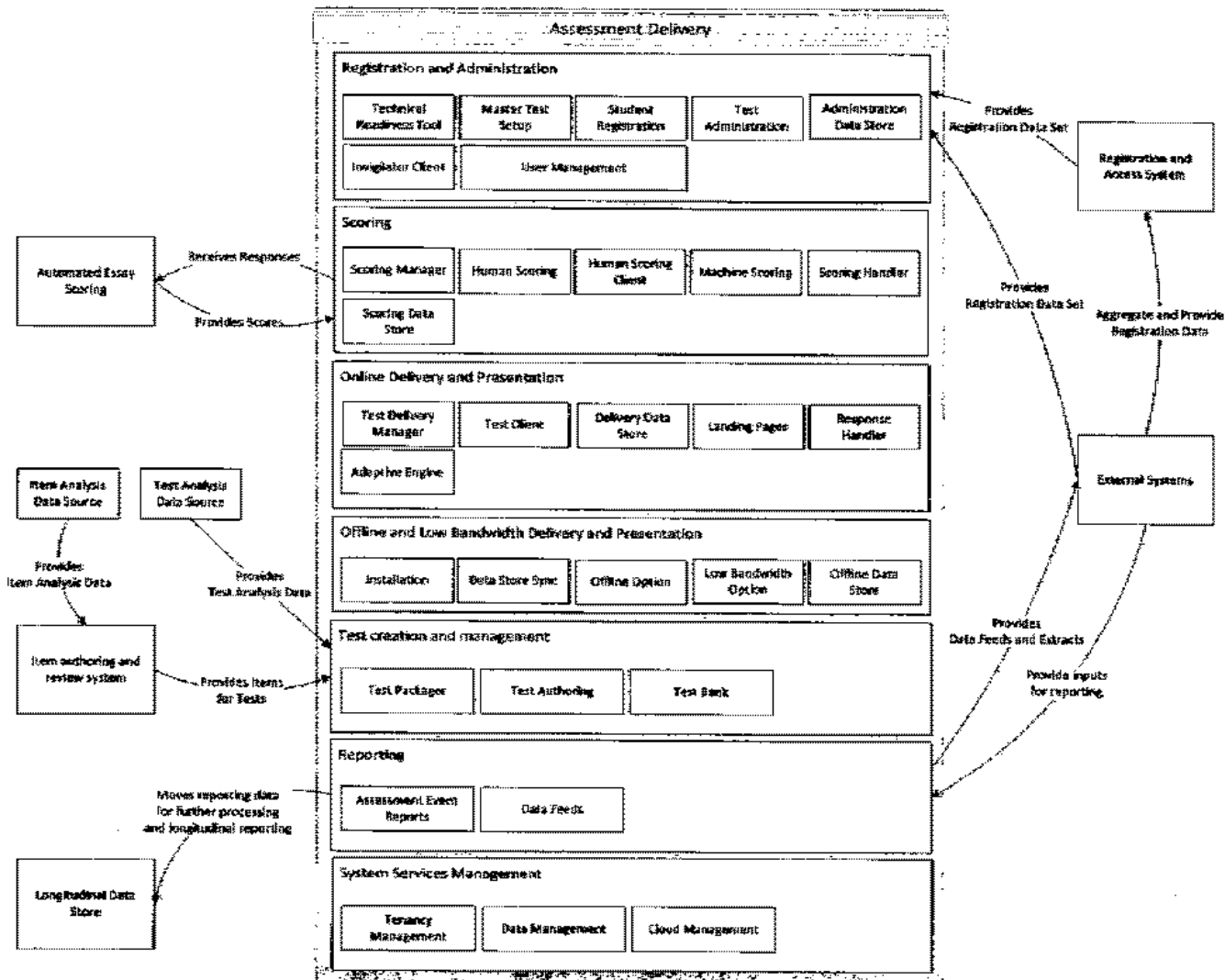


Diagram 5: Detailed components of Assessment Delivery

The following sections discuss each system.

## 5.2 Item authoring and review system

The item authoring and review system is responsible for creation and management of items and their related workflows. This system provides the content that is used by the assessment delivery system.

This system provides the front-end interface for item creation, update, view, review and approval, backed by a workflow engine. An item bank that stores items in the various stages of their lifecycle is also considered to be part of this component.

As the item authoring and review system provides content for use by the test creation and management component of the delivery system, it will be required to integrate with the assessment delivery system through one of the following methods:

Integration method	Description
APIs	If item authoring and review system makes its content available through a set of APIs, the delivery system can consume these APIs and bring the content into the delivery system. This would assume that the delivery system can understand and use the data schema prescribed by the item authoring system APIs.
Shared database and item locations	In case an agreement on the data schema and the methods and locations for storage of item assets is reached between the assessment delivery system and the item authoring and review system, it could be possible to bypass the APIs and achieve a tighter integration between the systems.
Export-import based on interoperability standards	This method should be provided even when one of the above solutions is available. It should be possible for the item authoring and review system to export items based on standards and for the assessment delivery system to import those item packages for further usage within the delivery system.

## 5.3 Assessment delivery system

The assessment delivery system is responsible for the management of the entire test delivery lifecycle. This system provides the ability to deliver tests to students as well as manage the logistics of registering students, assigning students to tests and assigning invigilators to test sessions. The delivery system also provides the ability to conduct assessments in low bandwidth and offline scenarios.

### 5.3.1 Components of assessment delivery system

The assessment delivery system is divided into seven components.

#### Registration and administration

This component provides the administrative functions for the assessment delivery system via hierarchical administrative access to features such as pre-test readiness checks, test scheduling, student registration and setting up of invigilators.

### **Scoring**

This component is responsible for managing the marking and scoring process after the test event has ended.

### **Online delivery and presentation**

This component provides the central interface for the platform. It is responsible for presenting the test to the student using the correct test options and any accessibility requirements. It also coordinates the test delivery and response handling.

### **Offline and low bandwidth delivery and presentation**

This component is responsible for providing the ability to deliver assessments in offline and low bandwidth scenarios.

### **Test creation and management**

This component is responsible for taking the items from item authoring and review system and creating a test that can be used for delivery of an assessment by the online delivery and presentation component.

### **Reporting**

This component is responsible for providing assessment event reports and data extracts based on agreed specifications.

### **System services management**

This component is responsible for providing access to administration services such as tenancy management, cloud management and data management.

The following diagram illustrates the main sub-components of the assessment delivery system.

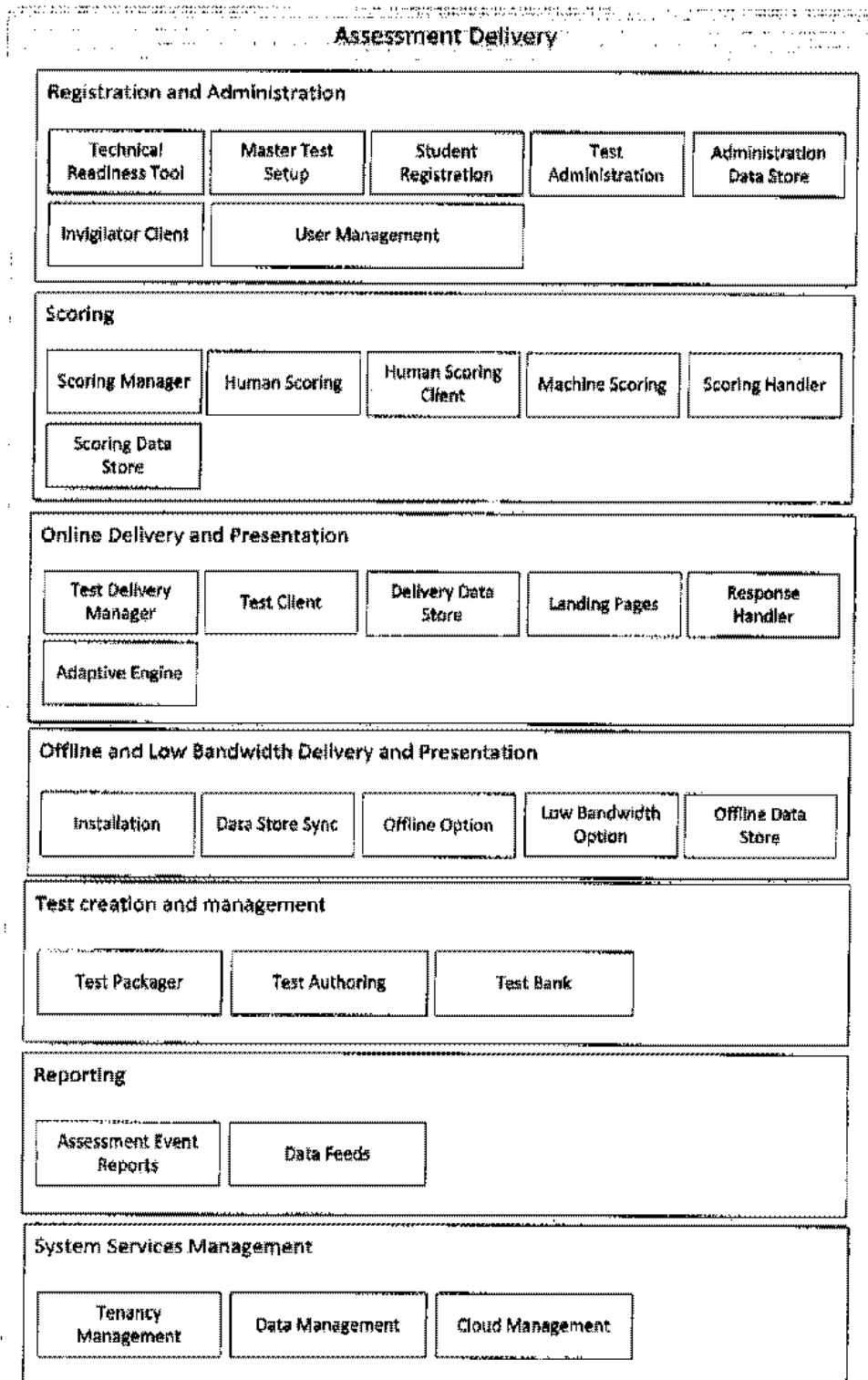


Diagram 6: Assessment delivery sub-components

### 5.3.2 Sub-components of registration and administration

#### Technical readiness tool

The technical readiness tool will be used as a comprehensive diagnostic mechanism for determining infrastructure readiness of a school to undertake a specific large-scale assessment.

#### Master test setup

This sub-component allows agency administrators to set up top-level administrative items for conducting large-scale assessments. These items include assessment event window, jurisdictional level administrative roles and linking potential test packages to assessment events.

#### Student registration

The student registration sub-component allows details of test takers to be set up prior to a large-scale assessment. Data is generally provided from a Student Information System (SIS) in formats such as a CSV file. If a Registration and Access system is available then the student registration sub-component integrates with the Registration and Access system to accept registration data in agreed upon formats.

#### Test administration

The test administration sub-component is used at the school level during a large-scale assessment. It includes pre-administration set-up such as creating school level assessment events, creating test groups, verifying students and assigning them to test groups, assigning invigilators and allocating offline resources such as rooms.

#### Administration data store

The administration data store is the operational database for storing any data created by the registration and test components.

#### Invigilator client

The invigilator client allows an invigilator to monitor the progress of a large-scale assessment session. The invigilator has the ability to log students into the assessment session, as well as pause and resume tests.

#### User management

The user management sub-component allows for creation of user accounts, authorization and authentication. The user management sub-component can also create user accounts in bulk by importing the user data through a method such as CSV files. If a Registration and Access system is present, the user management component can integrate with it and accept the information directly from it.

### 5.3.3 Sub-components of scoring

#### Scoring manager

The scoring manager processes student responses for a particular large-scale assessment and assigns the scoring to an appropriate engine.

#### Human scoring

The human scoring engine processes responses that cannot be handled by a machine scoring engine. The responses are added to a queue and assigned to human scorers based on configuration.

#### Machine scoring

The machine scoring engine processes all responses that can be scored.

#### **Scoring handler**

The scoring handler receives a score and sends it to the appropriate database.

#### **Scoring data store**

The scoring data store is the operational data base used by the Scoring sub component

#### **Human scoring client**

The human scoring client presents the responses to be scored to a human scorer along with the rubrics for scoring.

### **5.3.4 Sub-components of online delivery and presentation**

#### **Test delivery manager**

The test delivery manager is software that acts as the coordinator between all other components. It is responsible for reading the test package, initiating the adaptive engine, configuring and displaying the test client and managing the communication of responses to the response handler.

#### **Test client**

The test client is responsible for delivering the test to students.

#### **Delivery data store**

The delivery data store is the operational database for the delivery component.

#### **Landing pages**

The landing pages will provide the starting point for users to access the platform. Users may be directed to these landing pages from a central website/portal outside the scope of the delivery system. For example, the central website may have links for registering students for NAPLAN, creating users for administration and creating assessment events. Clicking on those links will bring the user to an appropriate landing page in the delivery system. The look and feel of the landing pages will have to be consistent with that of the central website.

#### **Response handler**

The response handler registers student responses and sends them to the appropriate database.

#### **Adaptive engine**

The adaptive engine can be configured with various adaptive algorithms for test delivery. The test manager reads the test package and starts the adaptive engine with the algorithm specified in test package specs.

### **5.3.5 Sub-components of offline and low bandwidth delivery and presentation**

#### **Installation**

The installation wizard guides a school administrator through set up of the system for offline assessment in tasks such as performing an offline technical readiness test, setting up an offline data store, configuring the offline assessment engine and deploying the offline test client.

The wizard also provides an option to de-install, clean up or remove the test instances and the data collected after test completion

#### **Offline option**

The offline assessment engine is the offline counterpart of the combined online test delivery manager, adaptive engine and response handler. The offline test client is the version used in the online test delivery scenario.

#### **Low bandwidth Option**

The low bandwidth subcomponent provides the Assessment Platform to enable delivery in the low bandwidth scenarios.

#### **Offline data store**

The offline data store is a local database that stores student details and responses. This data is later synced with the online database. The offline invigilator client is an offline version of the invigilator client used in the online test delivery scenario.

#### **Online data store sync**

The online data store sync enables efficient delivery of assessments in an offline scenario. After students have completed an assessment, the school administrator can start the offline-online data store sync to synchronise the local database with the online database.

### **5.3.6 Sub-components of test creation and management**

#### **Test authoring**

The test authoring sub-component is used by an agency to author large-scale assessments. It includes the interface for creating and managing tests and the workflows associated with their review and approval and provides the ability to create templates and specifications for tests.

#### **Test bank**

The test bank is an agency-specific repository for storing tests created by it for large-scale assessment. After tests are processed by the test packager, they are moved to the test bank.

#### **Test packager**

The test packager processes the test items, testlets, testlet sequences and specifications related to a test and packages them into a format that can be consumed by the test delivery system.

### **5.3.7 Sub-components of reporting**

#### **Assessment event reports**

The assessment event reports sub-component enables users to access a range of agreed upon standard reports based upon the user authorisation and access level.

#### **Data feeds**

Data feeds sub-component is responsible for providing a data extract to the authorised users as per the agreed upon specifications. The component is also responsible for extracting the data and moving it to archives or a data warehouse for any future usage, such as in longitudinal reporting.

### **5.3.8 Sub-components of system services management**

#### **Tenancy manager**

The tenancy manager enables the system administrator to provision a new tenant and manage existing tenancies.

#### **Data management**

Data management enables the system administrator to manage the databases, configure backups and set up archival policies and processes.

#### **Cloud management**

Cloud management provides the system administrator with a central interface to manage the cloud infrastructure. This includes initialising new cloud instances, increasing the processing power on demand, and monitoring traffic volume.



## 5.4 Longitudinal data store

The longitudinal data store is responsible for storing the assessment data after an assessment event has completed in the delivery system. The longitudinal data store will therefore have NAPLAN assessment data for each year. This in future can be used for longitudinal reporting, provided the registration data sources have been able to provide a consistent student identifier over the years.

It is important to understand the difference between the reporting responsibilities of the longitudinal data store and the assessment delivery system. The assessment delivery system is responsible for providing agreed upon reports and extracts on data within the context of an assessment event (eg in case of NAPLAN that is the yearly NAPLAN assessment data), the longitudinal data store is responsible for enabling reporting when the context is broader (eg reporting on NAPLAN data over multiple years).

## 5.5 Registration and Access

The registration and access system is responsible for user registration and maintenance, storing identifiers and ensuring correct access for users to various systems.

The registration and access system will also provide features for integration with various registration data sources such as the student systems at schools and jurisdictions and data hubs. The registration and access system will integrate with these systems based on standards such as SIF3.0.

When this system is not present, several of the business functions (such as user creation for NAPLAN administration) are met by the User Management component of the assessment delivery system, through simpler features such as a CSV import of user data.

When the registration and access system is present it can integrate with the delivery system through one of the following methods:

Integration method	Description
SIF 3.x/REST	Assessment delivery system should be able to connect to the Registration and Access system and access registration data through REST APIs.
Registration data set export/import	Registration and Access system should also be able to export the registration data set in formats such as CSV or SIF that can be imported by the assessment delivery system.

## 5.6 Automated Essay Scoring

The AE scoring system is responsible for providing scores for responses to questions marked for automated scoring. The system compliments the scoring assessment platform of the assessment delivery system.

Integration method	Description
APIs	The assessment delivery system will push student responses to the AE scoring system through the APIs made available by the AE scoring system. The assessment delivery system can then also read the scored response back from the AE scoring system through the APIs.
Data set export/import	The delivery system can also provide manual export of student responses that in turn can be imported by the AE

	scoring system. Similarly the AE scoring system can provide a manual export of scored responses that can be imported by the assessment delivery system.
--	---

## 5.7 Connections to external systems

The Assessment Platform will interact with various external systems to either exchange or reference data. These systems can be:

### Schools – student information systems (SIS)

SISs may interact directly with the system to provide student data or go through the jurisdiction's zone integration service (ZIS).

### Jurisdictions – zone integration services

Jurisdictions may set up a ZIS to which the schools can connect to provide student information. The system will then interact with the ZIS to fetch the student data.

### Data hubs

A data hub can provide a central aggregated source of student information for the students under its scope. It may connect to the system to provide a feed of student data.

It is important to note that when assessment delivery system will interact with these external systems, the data exchange methods will be limited to simpler export/import. But when a registration and access system is present it can integrate with these systems based on standards such as SIF3.x/REST.

In addition to these data sources, the Assessment Platform will also need to reference content in learning data stores such as Assessment Framework, Australian Curriculum, Scootle and any other learning repositories.

The methods used for integrating the assessment delivery system with these external systems are:

Integration method	Usage
Data export/import	<p>The assessment delivery system will import the student registration data provided by external systems such as those at schools and jurisdictions in formats such as CSV.</p> <p>The assessment delivery system will also be able to export result data extracts to authorised users.</p>
Data referencing	The assessment delivery system will be able to dynamically construct hyperlinks to items contained in external learning repositories.

## 6 Tenancy architecture

Multi-tenancy is the concept of designing a system so that a common instance of it can be used by different clients as if each was running its own exclusive instance. Each of the clients is considered a tenant in the system.

The Assessment Platform is designed around a similar concept of multi-tenancy with special requirements for data separation and privacy.

The Assessment Platform will be used by students and teachers from schools all over Australia for assessment services. The schools will belong to different education sectors (government and non-government) and states/territories and the Assessment Platform is designed to allow each education sector and state/territory full control over its data.

Therefore, in the context of the Assessment Platform:

- A **tenant** is an entity that enters into a contract with the Assessment Platform provider to provide an assessment service to the participants under it. For example, the Victorian Government sector in the case of NAPLAN.
- A **participant** is an entity that stays under a tenant for the purpose of an assessment service but maintains a logical control over its data. For example, a region, diocese or school.

It is important to note that the same entity can be a tenant for one assessment and a participant in another.

## 6.1 Tenancy architecture layers

The tenancy model in the Assessment Platform depends on factors both inside and outside the system.

While the system enables data separation by following the data principles and implementing logical data partitions (explained in section 6.4), the tenants decide the data sharing through agreements that are reached outside the system, though recorded in the system to guide its operations.

Tenants also need to ratify agreements around the administration of assessment services before they provide a third party with access to data in their system.

Based on these agreements, the system enables the level of access to various participants within it.

It is therefore helpful to think of the tenancy model in multiple layers where both the Policy Agreements layer and the Administration Agreements layer enable tenancies to provide assessment services.

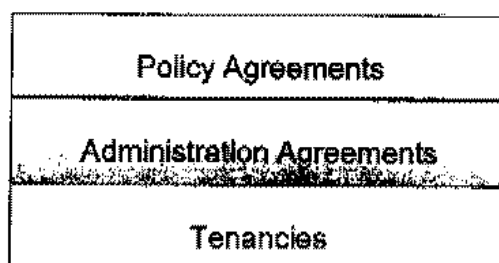


Diagram 7: Tenancy architecture layers

### Policy agreements

Policy agreements determine who can have access to the data under a jurisdiction and to what extent. The tenancies will need to have this agreement with each participant such as the schools, regions, dioceses and test providers such as ACARA. A tenant can have different policy agreements with different organisations and a number of tenants can also have a common agreement governing national level testing.

### Administration agreements

Administration agreements determine how the task of test administration is carried out. Test administration requires a certain degree of access to the system and data. Therefore the tenants must first reach an agreement with a test administrator and record it in the system. The system then enables test administration access on the basis of the agreement. The system supports various scenarios such as a number of tenants utilising the services of the same test administrator, each tenant having its own administrator and a tenant utilising different administrators for different assessments.

## 6.2 Sample configurations of tenancy model

The tenancy model in the Assessment Platform depends on factors both inside and outside the system.

### Sample configuration 1

The following diagram illustrates a sample configuration of the tenancy model for an assessment such as NAPLAN. An assessment of this kind will be enabled through a national data sharing agreement (along with other possible agreements) in the policy agreements layer and through a number of administration agreements in the administration layer.

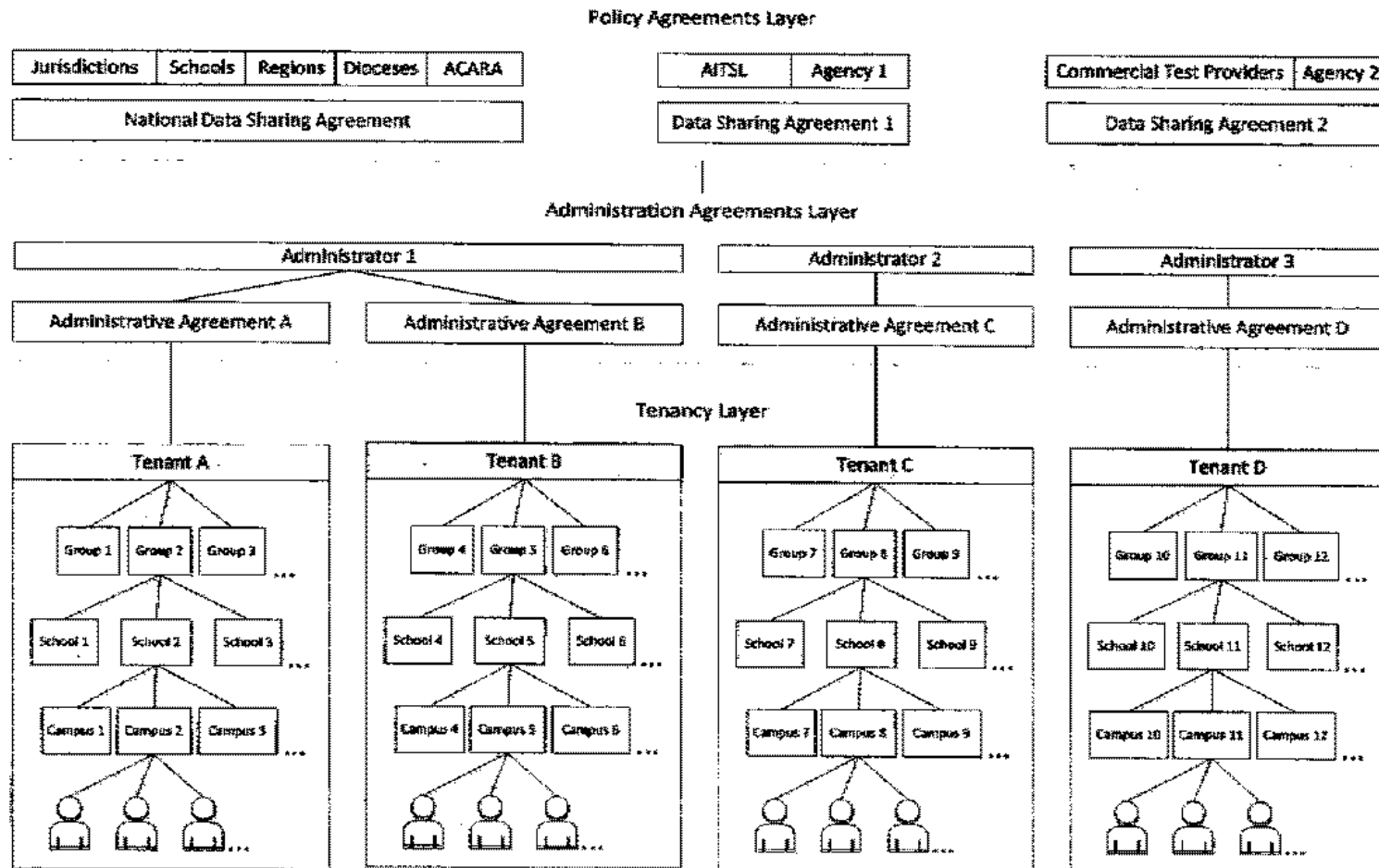


Diagram 8: Tenancy sample configuration 1

### Sample configuration 2

This configuration describes a different assessment scenario. A tenant from a previous example is not participating and two tenants have the same agreement with a test administrator.

It can also be seen that some of the groups and schools in the participating tenants from the previous example have opted out of this assessment.

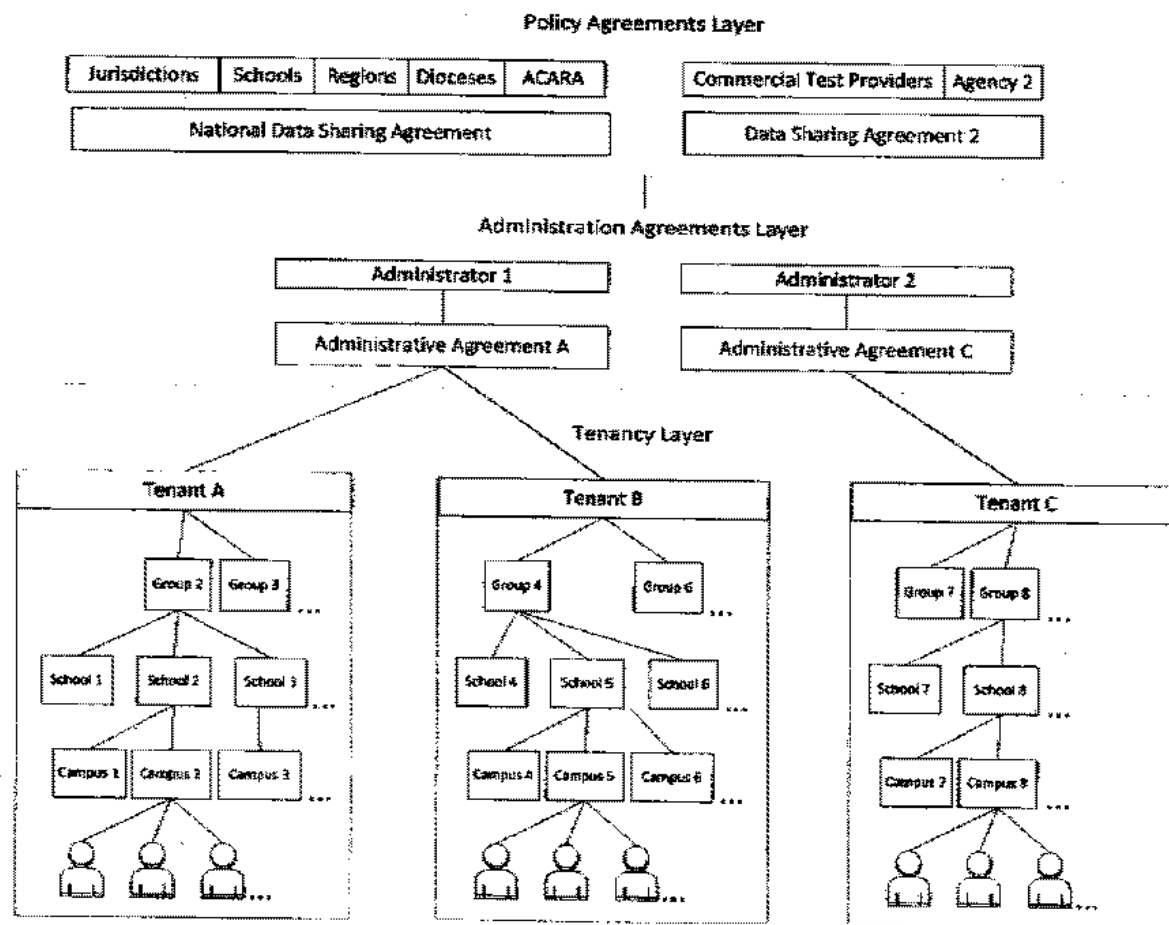


Diagram 9: Tenancy sample configuration 2

### 6.3 Example implementation of agreements

The following table illustrates the implementation of policy and administration agreements as discussed above. Please note the details are meant only as an example.

Assessment	Administrator	Tenancies	Participants	Identified data access	De-identified data access
NAPLAN	ACARA with NAPLAN Test Administration Authority (TAAs)	One tenancy for each education sector in every state and territory	All groups and schools under the groups	States and sectors are grouped together under a TAA for administration. Therefore the TAA will have access to identified data for producing student reports. Teachers and students will also have access to the data relevant to them.	ACARA and authorised researchers
Classroom	Teacher	One tenancy for each education sector in every state and territory	School	Teacher and students	ESA for purposes of resource matching and improving items
Commercial	Commercial organisation or a state or sector	One tenancy for each education sector in every state and territory	All participating schools	States and sectors	Possibly test provider (for scaling purposes)

For NAPLAN, the tenancy model would look like:

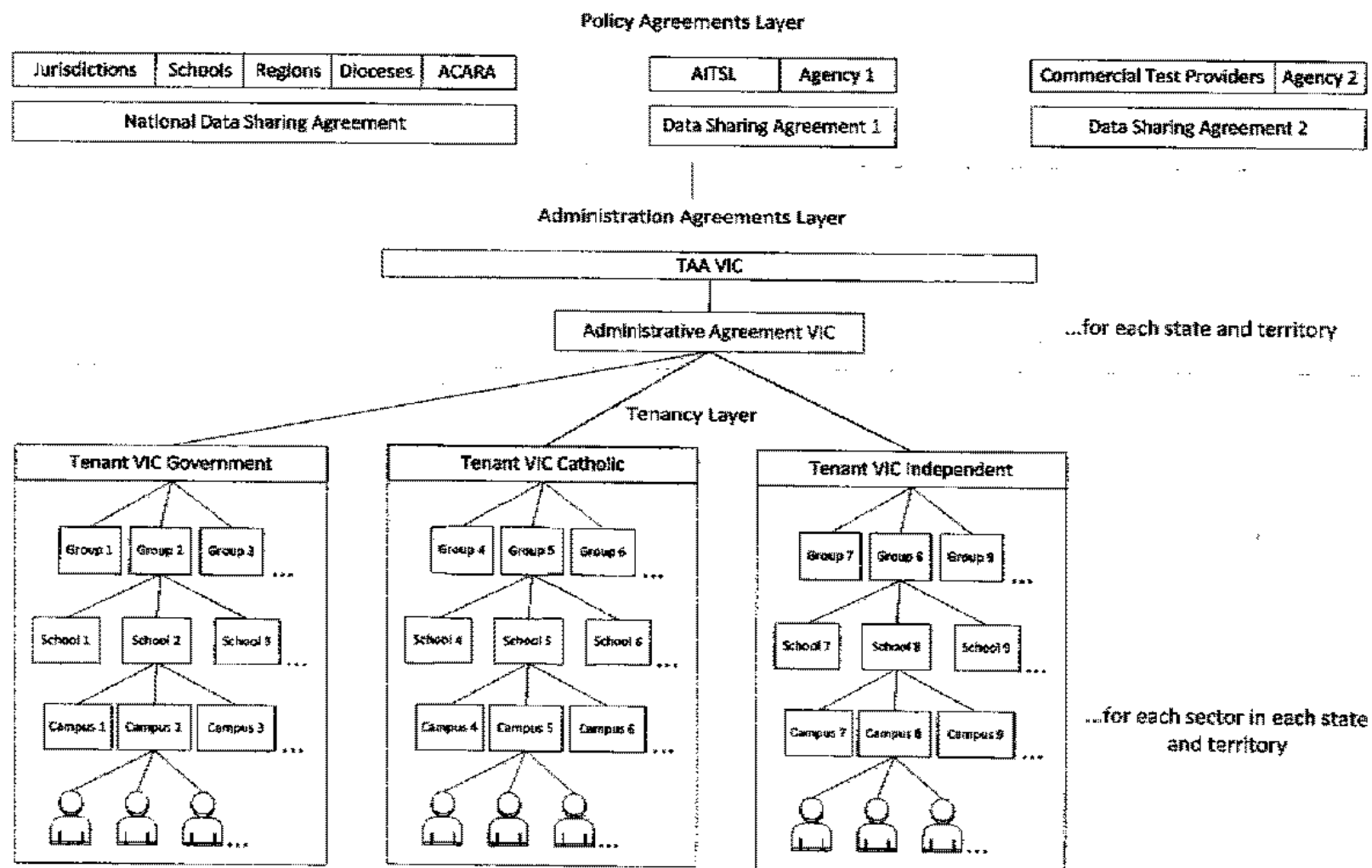


Diagram 10: Tenancy model for NAPLAN



## 6.4 Data separation

Data separation is the most fundamental requirement to enable a multi-tenanted system to serve different clients.

The data that belongs to a tenant such as student information, assessment responses and results, as well as the assessment items and tests created by teachers in the classrooms in that tenancy, must be accessible only to the authorised persons and organisations in that tenancy.

The Assessment Platform implements data separation through logical data partitions as described below.

### Logical data partitions

'Logical data partition' refers to the separation of data based upon an Identifier that uniquely links that data to its owner. The data in this case is visible only to the entity that it belongs to and is separated by the application through application logic which performs checks such as verifying the region or school ID before allowing access to that data.

The following table explains how data separation is achieved.

Entity	Data separation enabled by
Jurisdiction	Tenant ID
Group (such as region and diocese)	Group ID + tenant ID
School and campus	School ID (or Campus ID) + Group ID + Tenant ID
Student	Student ID + School ID + Group ID + Tenant ID

### Data Separation across Tenancies

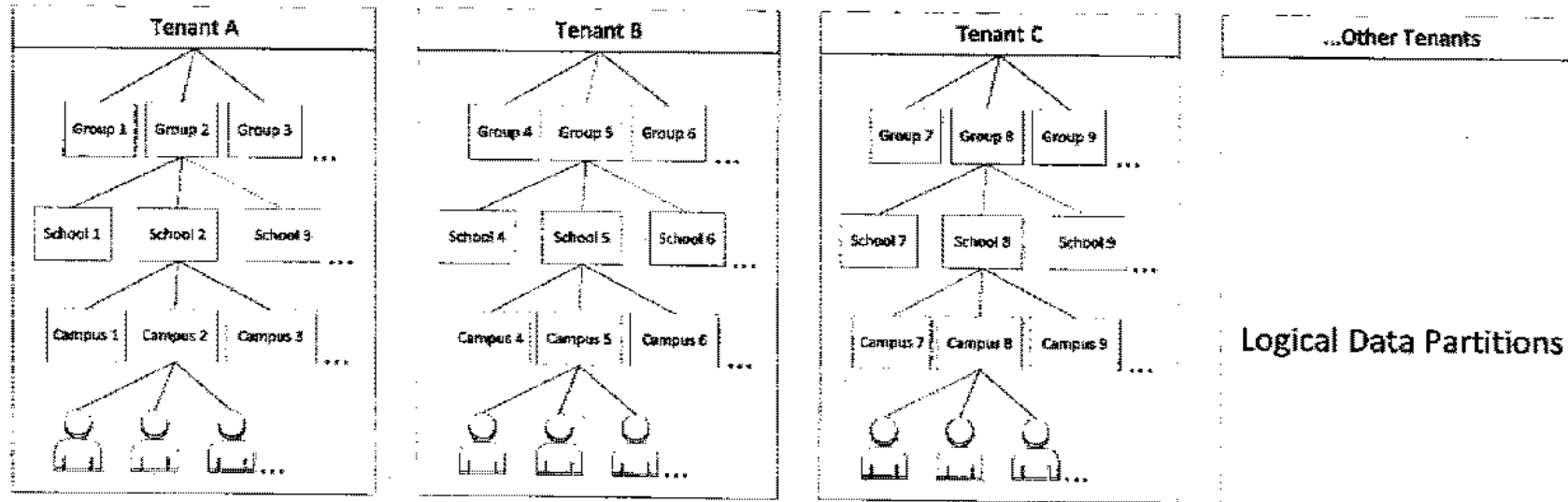


Diagram 11: Data separations across tenancies

## 7 Data Architecture

This section describes the data architecture behind the design of systems for the Assessment Platform. The section starts with discussing the data management principles and goes on to discuss the data flow in the Assessment Platform, data security, data quality, database guidelines and a conceptual data model for the design of the Assessment Platform.

### 7.1 Data Management Principles

The proposed Assessment Platform will adhere to a set of data principles. These are:

- **Data is visible only to the owner.** By default, data is visible only to its primary owner, starting at the lowest node (a campus) up to the jurisdiction.
- **Access to data that is not owned must be requested and obtained.** If an entity in the system needs to access the data owned by another entity, it must request access and obtain permission. The system facilitates this through agreements between different entities.
- **Data must be de-identified.** Any data that is shared by a jurisdiction with entities outside the jurisdiction must be de-identified to ensure privacy.
- **There must be compliance with the National Data Agreement.** Any data in the tenancies under the Assessment Platform will be governed by the National Data Agreement. The National Data Agreement will be arrived at during the implementation of the Assessment Platform.
- **There must be compliance with National Security Policies.** The Assessment Platform will comply with the National Security Policies to secure the data in the system. The Security is discussed in more detail in the Security section and a detailed System Risk Management Plan – System Security Plan (SRMP-SSP) will be prepared in the subsequent stages of the project.
- **Adherence to the Interoperability Framework.** Any data that is exchanged between the systems of the Assessment Platform or between the Assessment Platform and any external system must follow the data standards prescribed in the Interoperability Framework. Please refer to the 'Assessment Platform Interoperability Framework' for details.

## 7.2 Data Flow

The Assessment Platform provides a range of services to a large number of users starting from the students to the policy makers. For its operation the Assessment Platform depends upon an input of data from trusted sources and provides data to integrating systems outside the Assessment Platform.

This section describes a high level flow of data into the Assessment Platform and from the Assessment Platform to outside systems. An understanding of the data flow will help to understand the boundaries and thereby understand the responsibilities for maintaining data security and data quality.

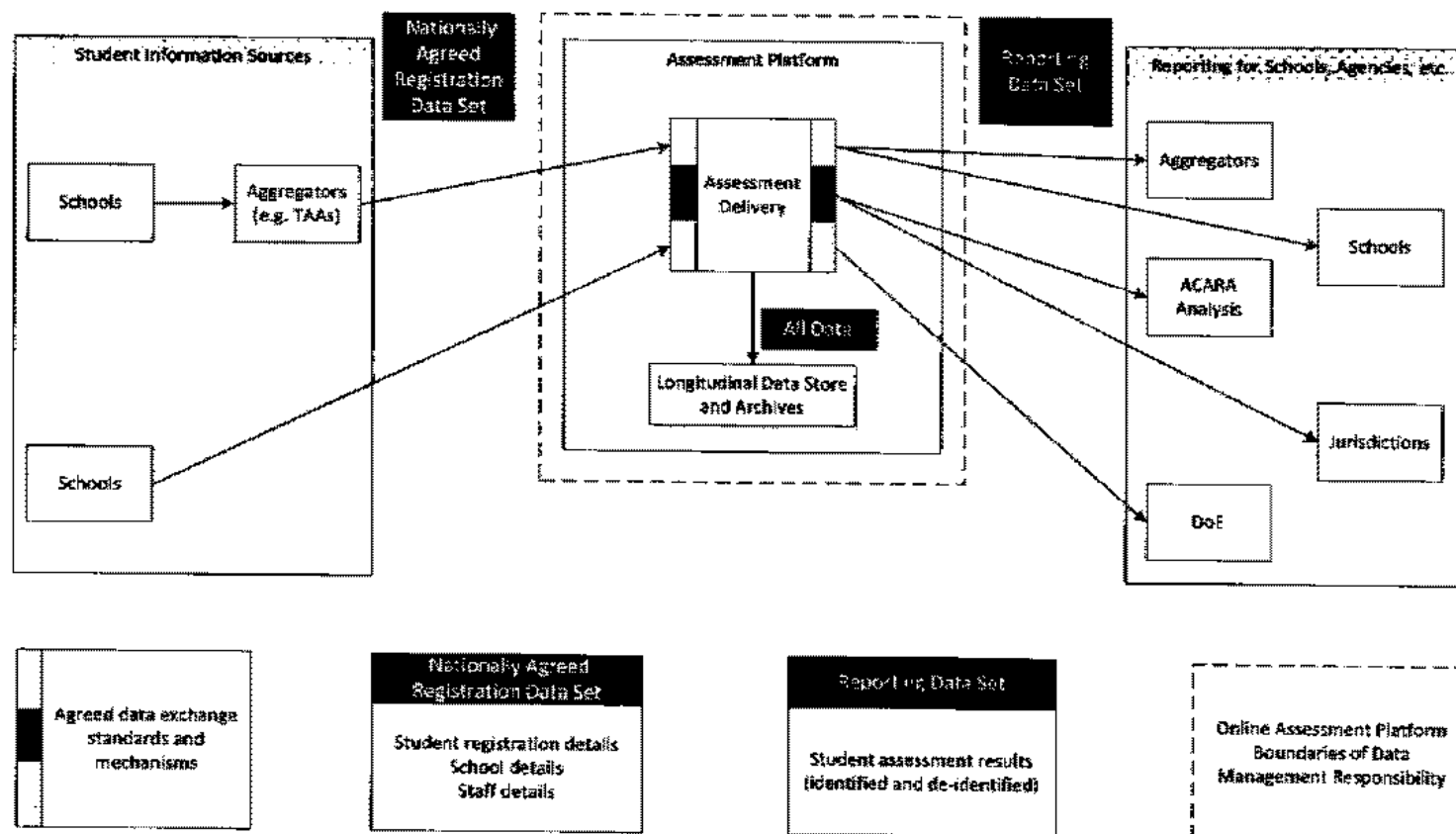


Diagram 12: Data flow across the boundaries

Aggregators refer to any agency that collects and manages the data related to multiple schools for a purpose such as account provisioning or national reporting. Some examples of aggregators are the TAAs which aggregate the student data from schools under a jurisdiction and ACARA which aggregates de-identified student result data for the purpose of national reporting.

As can be seen in the diagram, aggregators or schools directly will provide registration data sets to the Assessment Platform. The registration data set comprises of information such as the student details, school details and teaching and administration staff details. This is the data that enables the creation of student accounts in the Assessment Platform and enables the administration of an assessment.

The assessment delivery system uses this data to deliver an assessment and produces the reporting data set. The reporting data set comprises primarily of student assessment results in identified and de-identified forms depending upon the requirements of the receiver.

The Assessment Platform is responsible for data management from the time the data enters the Assessment Platform until the time it leaves the Assessment Platform.

## 7.3 Data Model

A conceptual data model closely following the various processes in the assessment delivery lifecycle has been developed. This section describes the data model. Please note that the data models will be further refined and developed during the system analysis and design phase.

### 7.3.1 Conceptual data model for tests

The following diagram illustrates conceptual data model relevant to the test construction and usage in the assessment delivery.

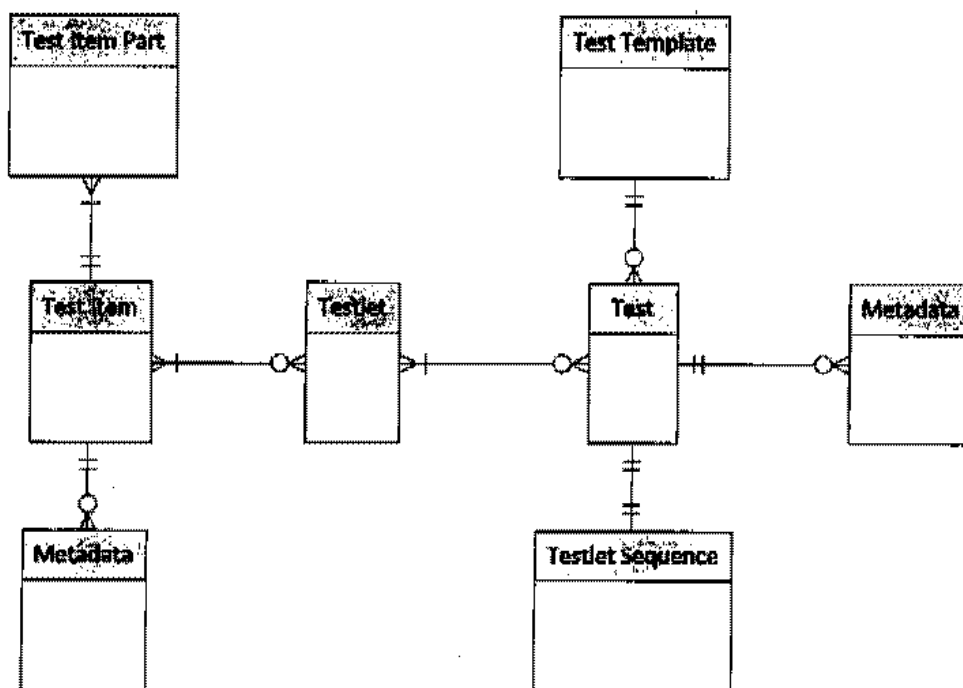


Diagram 13: Conceptual data model for tests

#### Test Item

A test item is an item provided by the item authoring application for use in construction of tests.

#### Test Item part

A test item is made up of one or many test item parts. These include content elements such as the prompt, stimulus and stem, as well as the associated rubrics information.

#### Testlet

Test items can be grouped together into testlets which can be further grouped into a test.

#### Test

A test consists of testlets and a testlet sequence which describes the logic for the use of testlets in that test. A test can also have metadata.

### **Test template**

A test template provides the ability to create similar tests and can be used by multiple tests.

### **Metadata**

One or more metadata objects can be related to test items, tests or any other objects that are identified as requiring metadata in the subsequent phases of the project.

### **7.3.2 Conceptual data model for assessment delivery**

The following diagram illustrates conceptual data model relevant to the delivery phase of the assessment lifecycle.

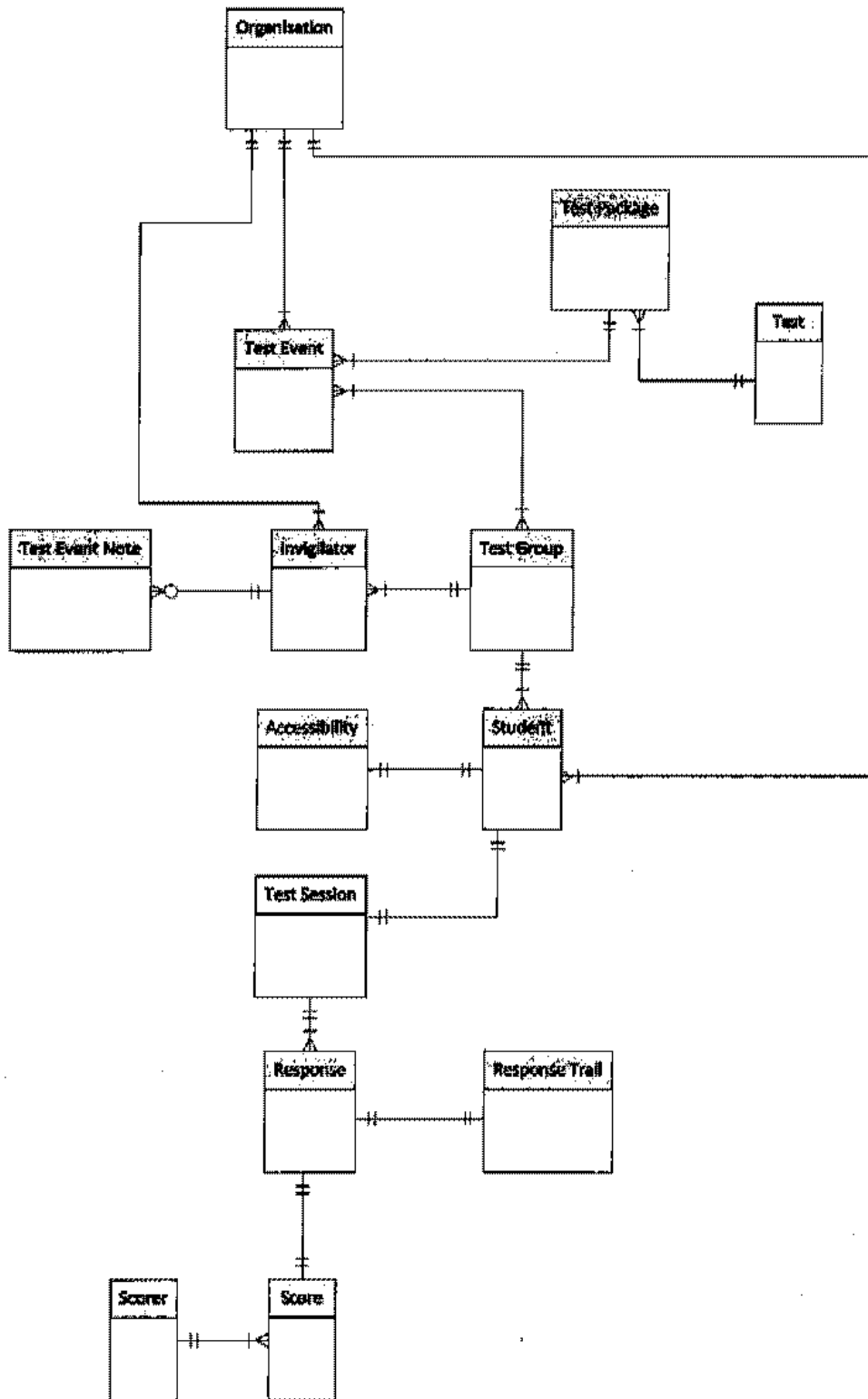


Diagram 14: Conceptual data model for assessment delivery



### **Organisation**

An organisation represents a body that creates a test event. An organisation can have another organisation as its parent and in that case the child inherits the test event information from the parent.

### **Test package**

A test package comprises of a test that is ready for delivery. It contains test related information specific to the delivery.

### **Test event**

A test event is the occurrence of an assessment with all information about the assessment, a test package and a test group. Test events are hierarchical in nature and inherit the properties from parent test events.

### **Test group**

A test group is the group of students assigned to a particular test event. A test group can appear in multiple test events.

### **Invigilator**

The invigilator is the official assigned to perform invigilation duties during a particular test event.

### **Test event note**

An invigilator can record information related to a test event in a note.

### **Student**

A student is the test taker in the context of the Assessment Platform. All students are attached to a test group. Every assessment that a student takes is managed under a test session.

### **Accessibility**

If a student has specific accessibility requirements, these are recorded in an accessibility entity.

### **Test session**

A test session is the envelope that represents the assessment event for a student. A test session contains student responses.

### **Response**

A response captures a student's answer to a particular test item. As a student will have several test items in a test session, there are also several responses in a test session.

### **Response trail**

Response trail contains the history of student responses to a particular test item. The response trail will tell which other response choices a student considered (or clicked or selected) before answering with the final response. The response trail will also contain other information such as whether the response was given after a test time limit had exceeded.

### **Score**

The responses are marked by scorers and every response has a score entity.

#### Scorer

A scorer marks student responses. A scorer entity is linked to multiple score entities.

### 7.3.3 Conceptual data model for reporting on assessment events

The following diagram illustrates the conceptual data model relevant to the reporting process.

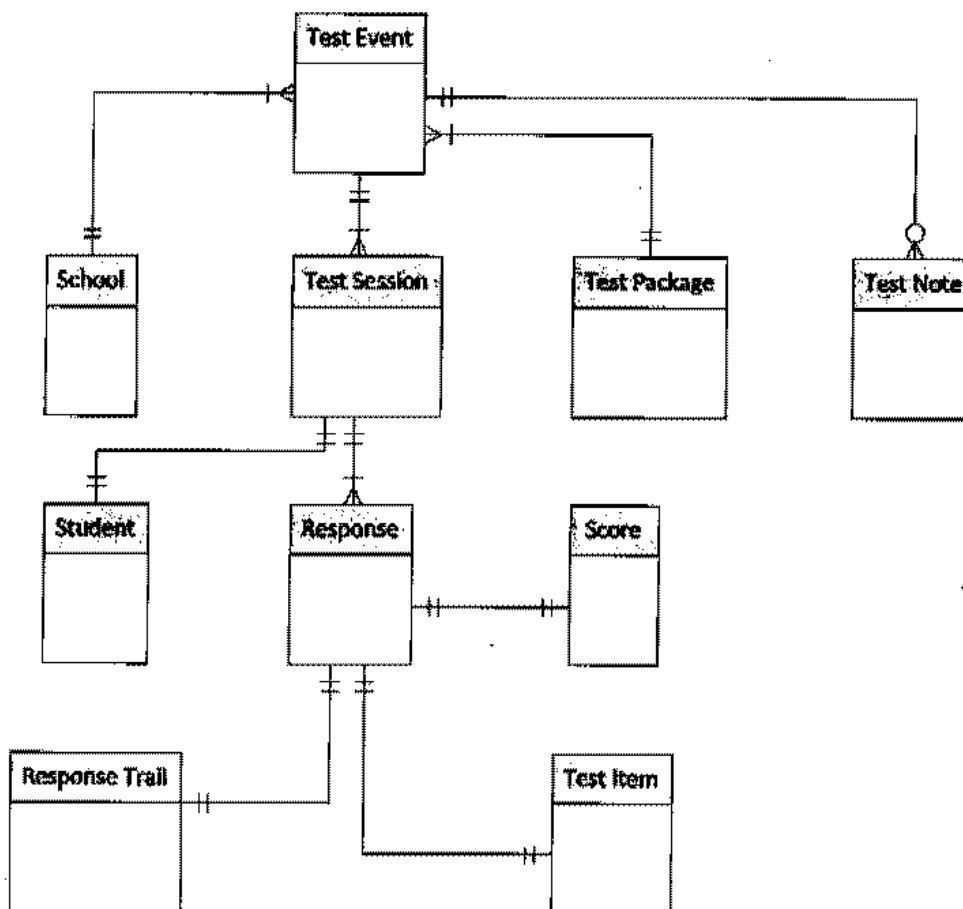


Diagram 15: Conceptual data model for reporting

These entities have been described in the earlier domain model sections. A combination of these entities will be used in providing all reporting functions the system.

### 7.3.4 Conceptual data model for user management and registration

The following diagram illustrates the conceptual data model for user management and registration.

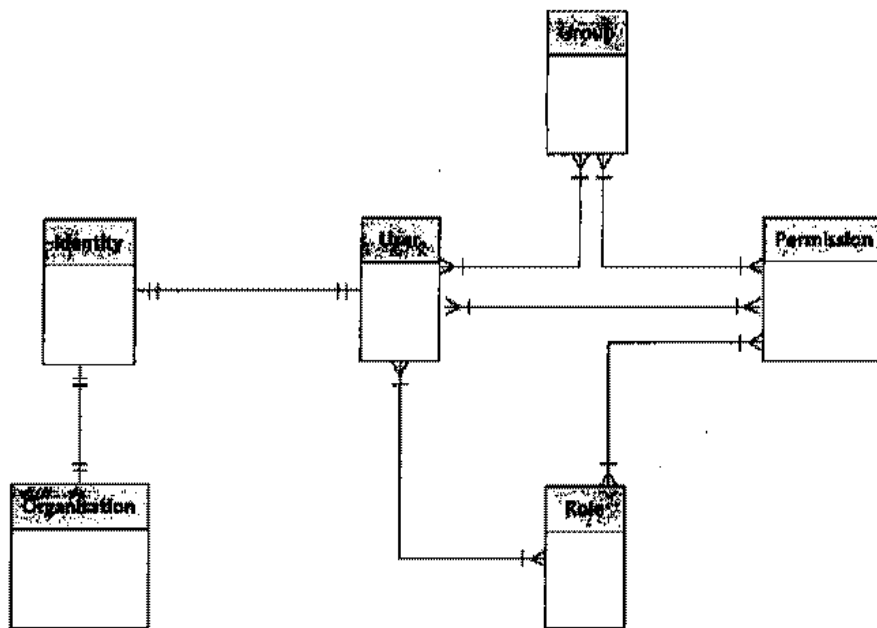


Diagram 16: Conceptual data model for user management and registration

#### Organisation

An organisation is a body such as ACARA, a jurisdiction or a school.

#### Identity

Identity refers to the central identity that is created and managed in an external registration and access system.

#### User

A user is a unique identity that has one entry in the user management component; however, is linked to multiple user instances in external systems.

#### Group

Groups allow for better management of users with similar access requirements. A user can be assigned to more than one group.

#### Role

Roles are used to delink the steps in a business process from a specific user. This is done by assigning a role to a specific process step and a user in its context. A user can have multiple roles.

## Permission

Permissions determine the level of access that a user has to an application. Permissions can be assigned to a role, group or user.

## 7.4 Data security

The data present in the Assessment Platform will contain information such as the student details, assessment content and student assessment results. Given the context, the data can be highly sensitive. It is therefore imperative that every required step is taken to ensure the security of data during different stages of its lifecycle in the system.

The data security measures will fit within the overall security guidelines as prescribed by the Australian Security agencies in the form of Protective Service Policy Framework (PSPF) and the Information Security Manual (ISM). The Assessment Platform Security Plan will discuss these measures in detail.

Data must be secured at every stage in its lifecycle within the Assessment Platform. These stages are:

1. **At Rest:** This is when the data has been saved into a database. The data in a database should only be accessible to authorised personnel.
2. **During Transfer:** This is when the data flows between different systems. Appropriate measures should be taken to establish secure connections between the systems.
3. **At time of release:** This is the milestone stage when the data is to be released for use in another system or wider distribution such as in the case of national results. At this stage measures should be taken to establish the identity of the person authorising the data release.

The data security measures should ensure confidentiality, integrity, authentication and non-repudiation of data.

1. **Confidentiality:** Ensuring information is accessible and readable only for authorised users.
2. **Integrity:** Protecting information from accidental or deliberate manipulation.
3. **Authentication:** A robust authentication system is essential for protecting access to systems.
4. **Non-repudiation:** Provides proof that a user performed an action on data

As the Assessment Platform operates in a multi tenanted environment, special data security measures are required to ensure that a tenant's data is kept separated and secured from that of another tenant's. The security section of this document discusses this in more detail.

The security measures that are applicable to a type of data depend upon the classification of the data and the life cycle step it is in. Therefore the first step in establishing appropriate security measures for data is to conduct a data classification exercise.

Based upon the results of the classification exercise security options can be chosen. These measures will be discussed in detail in the security plan. Common aspects of security are discussed in the security section 8.

## 7.5 Data Encryption

Data that is identified as sensitive can be secured further by using an encryption technology.

The ISM provides detailed guidelines for the choice of encryption technologies. The Australian Signals Directorate (ASD) provides a list of products that have completed an ASD Cryptographic Evaluation (ACE). The ASD also provides a list of Approved Cryptographic Algorithms (AACA) and Approved Cryptographic Protocols (ACP). Any products that are chosen for encryption should have been approved by ASD.

These requirements can be met by encryption technologies such as Transparent Data Encryption (TDE) for products such as Microsoft SQL Server. TDE provides a range of encryption schemes and both row and column level encryption. It is recommended that Advanced Encryption Standard (AES) is chosen as the encryption mechanism for TDE.

For scenarios where offline access is required such as a test delivered on a USB drive, full disk encryption will be considered. Full disk encryption provides a greater level of protection than file-based encryption. While file-based encryption may encrypt individual files there is the possibility that unencrypted copies of the file may be left in temporary locations used by the operating system.

## 7.6 Data quality

The Assessment Platform aims to enable a range of assessment services for the country and reuse of data that has once been captured in the system, such as the student registration details. It is therefore of vital importance that processes are put in place to ensure that data is of a suitable quality.

The architecture very clearly defines the boundaries of the Assessment Platform. The quality of data within the Assessment Platform depends upon data that is supplied by external systems at schools and aggregators. Therefore each party that is involved in sending information to the Assessment Platform or consuming information from the Assessment Platform will have a significant role in ensuring quality of data.

The following table describes the responsibilities of each party in maintaining the data quality outside and within the Assessment Platform.

Data quality measure	Tenants	Assessment Platform
Ensure quality of source data	<ul style="list-style-type: none"><li>• Monitor and control the quality of source data</li></ul>	
Data standards agreements	<ul style="list-style-type: none"><li>• Agree on a common data format for exchanging information with the Assessment Platform</li><li>• Agree on an identifier to uniquely identify the records</li><li>• Supply all data to the Assessment Platform in the agreed formats</li><li>• Adhere to the formats recommended in the Interoperability Framework</li></ul>	<ul style="list-style-type: none"><li>• Agree on a common data format for exchanging information with external systems</li><li>• Work with external stakeholders to agree on identifiers</li><li>• Accept data supplied in any format and method specified in the Interoperability Framework and as agreed upon in the agreement</li></ul>

Data quality measure	Tenants	Assessment Platform
Data validation	<ul style="list-style-type: none"> <li>Validate all data against the agreed formats before sending to the Assessment Platform</li> <li>Validate all data while aggregating records</li> </ul>	<ul style="list-style-type: none"> <li>Validate all data before accepting it in the Assessment Platform</li> <li>Generate validation error reports and logs</li> </ul>
Data management process improvement	<ul style="list-style-type: none"> <li>Review the feedback received from the Assessment Platform in the form of error logs to identify issues in the data management processes</li> <li>Educate all personnel involved in the processes on how to maintain and aggregate data to ensure high quality</li> </ul>	<ul style="list-style-type: none"> <li>Provide timely feedback in the form of validation error reports and process logs</li> </ul>
Data redundancy minimisation	<ul style="list-style-type: none"> <li>Identify the source of data and ensure there is no duplication in multiple systems</li> <li>Nominate one system and consistently use that system for the purpose of consolidating data and providing it to the Assessment Platform</li> </ul>	<ul style="list-style-type: none"> <li>Do not create multiple tables holding the same data in different components and subcomponents of the Assessment Platform</li> <li>Integrate the components following standard approach wherever there is need to exchange data between the components</li> </ul>

## 7.7 Data Backups

Any data that is captured in the Assessment Platform will be backed up to safeguard against any failure incidents.

The Assessment Platform requires a three pronged approach for data backup. It should be possible to recover data at any given point in time. It should also be possible to go back to an hourly, daily or weekly snapshot if needed. Furthermore the infrastructure should have checks in place to mitigate any geographical risks by keeping copies of data in multiple places. The following diagram illustrates this three layered approach to data backup:

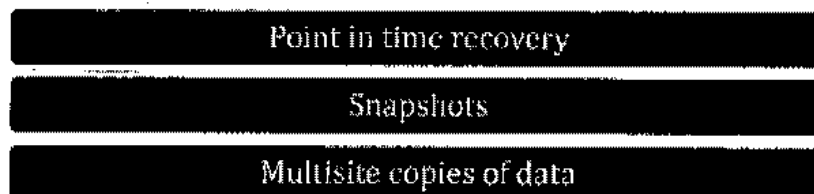


Figure 17: Assessment Platform data backup approach

**Point in time recovery:** The Assessment Platform infrastructure should support point in time recovery. This approach ensures that data can be recovered at any given point of time.

**Snapshots:** Regular snapshots of the virtual instances storing physical files and running applications ensure that a new instance of the system can be brought up in minimum required time in case of a failure.

**Multisite copies of data:** It is also important to ensure that the data is protected against any geographical calamities or accidents at one physical location. Therefore all data should be backed up and copies stored at multiple locations.

Service Level Agreements (SLAs) will be worked out with the vendors to ensure they meet the required targets.

## 7.8 Database considerations

The Assessment Platform will generate an immense amount of data in a variety of scenarios. The system will be required to write a vast number of student responses to the database during a large-scale summative assessment and must ensure that database reads consume as little time as possible during test delivery.

The database must also scale horizontally with ease.

In view of these considerations it is thought that the Assessment Platform will utilise more than one database engine.

A NoSQL database such as Cassandra or Azure DocumentDB will provide the ability to store a large number of test responses per second and will be able to scale as needed.

The system will also use a relational database such as the SQL server, in order to maintain direct relationships between tables and perform complex queries and data retrieval. It is suitable for information that is within the scalable limits for a traditional SQL based database. Therefore an SQL server can be used for storing items, tests, user information, scores and reporting.

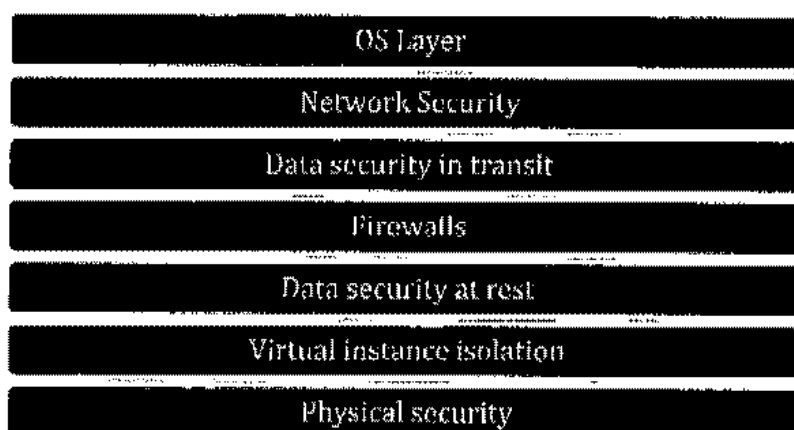
## 8 Security

The security measures for the Assessment Platform are guided by the Protective Security Policy Framework (PSPF) and ISM of the Australian Government.

The PSPF specifies 33 mandatory requirements classified across Governance, Personnel Security, Information Security and Physical Security categories. The ISM recommends 35 cyber threat mitigation strategies that complement the information security requirements in the PSPF.

This section provides an overview of the architectural approach in securing the Assessment Platform. A complete discussion of how the architecture aligns with the requirements and strategies in PSPF and ISM will be available in the security plan.

The Assessment Platform has a multifaceted approach to security. A layered approach to security has been taken as illustrated in the following diagram:



**Figure 18: Assessment Platform security layers**

**Operating system layer:** Security at operating system (OS) layer is achieved by ensuring the OS, frameworks and other supporting technologies that form the base on which Assessment Platform is deployed, are kept at the provider recommended version and any security related patches are applied as soon as possible.

**Network security:** Network security handles concerns such as distributed denial of service (DDoS) attacks.

**Data security in transit:** As the data is transferred between end nodes in the infrastructure it has to be encrypted and secured.

**Firewalls:** Firewalls are an essential component of the security infrastructure as they scan and block unauthorized or malicious connections to the applications hosted in ESA data centers.

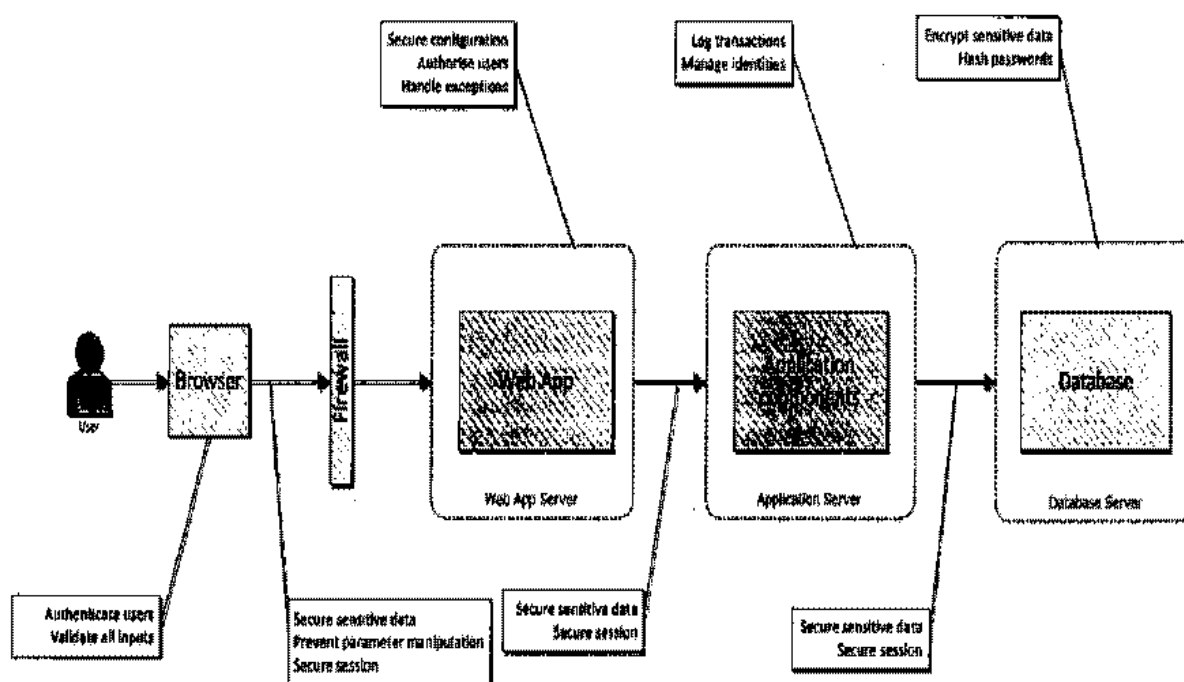
**Data security at rest:** Any data that has been identified as sensitive or classified should be stored in the database in an encrypted form.

**Virtual Instance isolation:** The infrastructure in the data centers is virtualized and then made available to the applications. Therefore it has to be ensured that one virtual instance does not in any case access the physical infrastructure resources allocated to another virtual instance.



**Physical security:** Physical security layer concerns with allowing authorized access to the infrastructure in the data centers. As a rule of thumb access is kept at a minimum and made available only when required.

The success of these measures depends upon how they are translated to the application design as shown below.



**Diagram 19: Security considerations in application design**

The first layer at which security needs to be considered is the browser which will display the interface. All application components must validate all user inputs after authenticating them from the identity management component. All user input should be validated for type, format and length and passed on only if validated.

Firewalls will need to be installed between application components. Firewalls should allow the filtering of the IPs and allow connections only from reliable sources.

Data must be protected when transported from the browser to the web application server. A secure connection should be established using technology such as SSL (Secure Sockets Layer)/TLS (Transport Layer Security). During the transportation all components should consider securing the session and protecting sensitive data.

The web application server should authorise the users and provide access on the basis of their role in the application. The web application should also be able to handle any exceptions appropriately.

The application server should log all activity and transactions and manage the identity and user details between various components. The application server should have enough validation in place to ensure that only sanitised data is passed to the database.

The database will store sensitive information such as user credentials and assessment results. The various system components should consider appropriate security requirements and implement them when storing data. These can range from hashing the passwords to sophisticated encryption algorithms.

### **Security in a multi-tenant environment**

As the Assessment Platform will store data for several tenants over a common infrastructure, the following solutions can be adopted to provide security in such a scenario.

#### ***Trusted database connections***

This approach involves creating a database access account for each tenant, and using Access Control Lists (ACLs) to grant each of these tenant accounts access to the database objects the tenant is allowed to use. When an end user performs an action that directly or indirectly requires a call to a database, the application uses credentials associated with the tenant account, rather than credentials associated with the end user. Within the application itself, security code prevents end users from receiving and modifying any data that they are not entitled to access.

#### ***Tenant view filter***

SQL views can be used to grant individual tenants access to some of the rows in a given table, while preventing them from accessing other rows.

#### ***Tenant data encryption***

A way to further protect tenant data is by encrypting it within the database, so that data will remain secure even if it falls into the wrong hands.

As a possible solution, three keys can be created for each tenant as part of the provisioning process: a symmetric key and an asymmetric key pair consisting of a public key and a private key. The symmetric key is used to encrypt the tenant's critical data for storage. To add another layer of security, a public/private key pair is used to encrypt and decrypt the symmetric key, to keep it secure from any potential interlopers.

When an end user logs on, the application uses impersonation (through trusted database connections) to access the database using the tenant's security context, which grants the application process access to the tenant's private key. The application (still impersonating the tenant, of course) can then use the tenant's private key to decrypt the tenant's symmetric key and use it to read and write data.

## 9 Technical concepts specific to the Assessment Platform

This section discusses the main technical concepts that are specific to the Assessment Platform.

### 9.1 Linking to the learning data stores

The system references the learning resources maintained in the learning data stores. Learning data stores contain Australian Curriculum, Assessment Framework, Scootle and learning repositories with content.

A similar implementation to link learning resources to curriculum was done by ESA in the Scootle project.

For an example, visit <http://australiancurriculum.edu.au> and explore a particular year's curriculum, such as <http://www.australiancurriculum.edu.au/Year1>.

The Assessment Platform must similarly link test items to learning resources. Curriculum items are available from the Australian Curriculum website as (RDFs). The Assessment Platform will need to read the curriculum description and store it in a local Australian Curriculum data store. This data store will provide key metadata options during item creation. After delivery this metadata can be used to link the test items to resources maintained in:

- an application such as Scootle

A link will be dynamically generated on the basis of metadata and displayed with the test item; for example:  
[http://www.scootle.edu.au/ec/search?learningarea=%22English%22&accContentId=ACELA1443&userlevel=\(1\)](http://www.scootle.edu.au/ec/search?learningarea=%22English%22&accContentId=ACELA1443&userlevel=(1))

- a generic learning repository

This could be any application that maintains the learning resources on the basis of key metadata

- assessment framework

The assessment framework links test items with key learning areas. This data will also be stored in a local database and used as metadata for items and tests in the system.

Education Services Australia has created several systems for standardising the description of learning resources for Australian students. These systems provide a common metadata framework and include the Learning Exchange (LEX), Sharing Exchange (SHEX) and Metadata Exchange (MEX). The Assessment Platform will download metadata from these sources and ingest it in the content stored in the system.

More information on these systems can be found at the National Digital Learning Resources Network website ([www.ndlrn.edu.au](http://www.ndlrn.edu.au)).

## 9.2 Offline and low bandwidth delivery

The Assessment Platform will be required to work in low bandwidth and no bandwidth environments. Therefore the assessment delivery system must enable offline delivery. This is depicted as the offline and low-bandwidth delivery and presentation component of the assessment delivery system and encapsulates the main test delivery application.

All delivery sub-components should therefore consider offline as well as low-bandwidth scenarios in their architecture and design. Refer to section 11 for details of deployment and hosting guidelines.

## 9.3 Training environment (sandbox)

The Assessment Platform targets a large number of users. It is an application that every teacher and student in every school in Australia will use on a regular basis and therefore requires a training environment for users that contains guidance in all components of the Assessment Platform.

The sandbox will contain its own database with ready-to-use accounts for each role.

Accounts for the training environment will be created on demand by the organisation's administrator and provided to users. The accounts will map to the test user profiles already present in the system.

The following diagram demonstrates this in a school scenario.

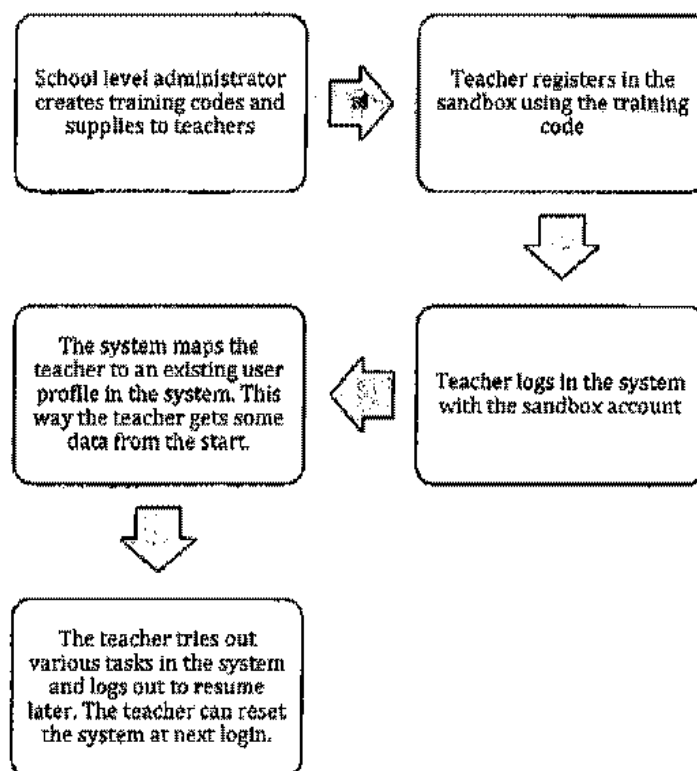


Diagram 20: The role of sandbox in user training

## 10 Design and development guidelines

This section provides a set of guidelines to be followed during the design and development phase of the Assessment Platform.

- All systems and components should be designed for a cloud environment. All components should lend themselves to scaling up in a cloud environment.
- An appropriate caching technology depending on the data to cache and where to cache with a suitable expiration policy should be used in the design and development of system components.
- Appropriate protocols for secure communication across layers and tiers of the Assessment Platform should be used.
- The system components should be designed such that there is loose coupling across layers.
- The system components should use asynchronous communication and queuing as needed and where possible, such as in response handling and marking.
- All system components should handle and log exceptions, and provide notifications when required.
- During the design emphasis should be put on how to validate the data; which techniques to use for validating on length, range, format, and type; how to constrain and reject input invalid values; how to sanitise potentially malicious or dangerous input; and how to define and reuse validation logic across application layers and tiers.
- All system components should be deployed on hosting infrastructure that is located within Australia.
- The solution should not be designed in a way that causes any data or information to cross the Australian borders.
- All information when communicated between systems in the Assessment Platform should be transferred over a secure encrypted connection.
- The design of the Assessment Platform should evaluate all data elements and their security and privacy concerns and apply adequate encryption methods where needed. For example data encryption at database level using TDE in Microsoft Server, data encryption during transfer of data using a TLS connection and disk encryption while transferring data through a USB.
- Any encryption products that are used as part of the solution should have completed an ASD approved evaluation.
- All teams working on the design and development of the Assessment Platform should follow agreed upon development, integration and release processes.
- A common source code repository should be used by all development teams.
- A common issue tracking and change management tool should be used by all development teams.
- Any offline media that forms part of the solution and that stores sensitive information should be encrypted and only an ASD approved algorithm should be used for this.
- The infrastructure design should ensure that adequate antivirus and internet security are used on servers and workstations.

- The various teams involved in development, release and management of system components must follow a well-defined procedure for installation of security patches, OS updates and application updates. Having a well-defined procedure will ensure that the integrity and authenticity of the patch or update has already been tested, its impact on other components has also been assessed, tested and managed, resulting in minimum disruption of the service.
- The top level functional components of the solution should be deployed on separate physical or virtual server instances. This will ensure that any instance of failure of one server will not compromise the operation of entire service.
- As the Assessment Platform evolves, new functionality will be added, or existing functionality modified. Changing requirements, may also affect the purpose and classification of servers. Therefore, all information related to the classification of servers and data should always be kept updated. Whenever there is a change to the Assessment Platform, the classification information should be reviewed and updated, if needed.
- All infrastructure solution should ensure that all servers and workstations implement application whitelisting. The administrator, or any other user with access to the systems, must not be able to execute any applications that are not approved.
- All systems should be designed following a role based access model and the principle of least privilege that is required to perform a function that a user is authorised for.
- The infrastructure design should ensure that no user can bypass the application whitelisting.
- The permissions on various servers or instances should be configured such that write access to executable folders is restricted. This will minimise the risk of deleting any supporting files, modifying any configurations and adding any vulnerability to the Assessment Platform.
- Any user involved in the design, development, release, deployment, configuration or management of any software component should have access only to the servers or instances and the environments that contain the system components that user is responsible for.
- The development teams should adopt common secure programming guidelines keeping in mind the ISM recommended strategies to mitigate cyber security risks. For instance, common techniques to validate and escape inputs to defend against SQL injection type of attacks.
- The development teams should also agree upon and adopt a common set of coding standards.
- Detailed hosting and deployment guidelines should be written and maintained for each system component. This should include the measures to secure, configure and harden the web servers.
- The database administrators should ensure that any database features that are not used by the Assessment Platform are disabled. This reduces the possibility of these features being used for malicious purposes. The design and development teams should clearly specify the database requirements for their system components.
- The database software should be run under a separate account that is setup solely for this purpose. The account should be given the minimum privileges needed for this purpose. This separation of responsibilities and privileges ensures that the account is not used for any purpose other than that intended.
- Any information that has privacy concerns should be stored in an encrypted form. All passwords should be hashed using a strong algorithm which is uniquely salted.

- The databases should be setup such that user roles are tied to the very specific business requirements and work duties of the users. The users should be able to access only the tables they need to perform their work. Privileges to select, update, insert content should be granted only where absolutely required.
- Multi factor authentication should be used in the design of the Assessment Platform. All administrators should be authenticated using multi factor authentication.
- The infrastructure should be designed such that the Database servers are located on instances separate from those used for deploying the web servers. This will help with the load separation as well as isolates the database server from any threats to the web server.
- The development teams should setup separate databases (with dummy datasets) for use during development and QA phases. In no instance should a test be done on a production database.
- The development teams should ensure that any error messages do not give away solution specific information such as the underlying database instance or user name.
- The Assessment Platform should be designed with a common log server. All system components should remotely log events on to the common server. The design should consider encrypting the logs to prevent unauthorized changes. An administrator responsible for managing the log server should only be the one with access to that server.
- To enable efficient logging a common consistent time source should be used by all system components while logging the events. This can also be achieved by synchronizing the various servers using something like the Windows Time Service. The infrastructure design should designate one server in the network as the reliable authoritative time source and other servers can be synchronized with this server through the Windows Time Service.
- All system components should be designed such that access to any functionality is provided only after authentication and authorization checks. For this purpose, all system components should also work on the basis of uniquely identifiable users.
- The administrators should ensure that any accounts created on the systems are linked to specific users. Accounts should be regularly audited and any unnecessary accounts should be removed regularly.
- All systems components should be designed with configurable automatic timeout and logout.
- The infrastructure design should provision for offsite data backups. This can be designed using the inbuilt tools provided by the cloud infrastructure provider or using a third party service that automates the process. The pros and cons of these approaches should be considered while deciding the approach.
- The design of the Assessment Platform should lay sufficient emphasis on establishing data management processes such as the validation. Data interfaces schemas should be clearly defined and maintained throughout the design and development process.
- The design of the Assessment Platform should consider multi stage authorization for all relevant processes, especially the ones where data is released.
- The infrastructure plan should consider installation of dedicated network and host intrusion detection and protection software on the servers.

- The design of the Assessment Platform should not create tight coupling between logically independent systems of the Assessment Platform. As far as possible a system should be able to operate (even if in reduced capacity) when another system goes down due to any reason.
- The Assessment Platform should be designed in a way that it is independent of the underlying hardware. It should be possible to move the system components to another infrastructure provider or from a cloud environment to dedicated servers in data centres if needed.



## 11 Deployment and hosting guidelines

The Assessment Platform must have the ability to scale up and scale back based on demand and hosting in a cloud environment will achieve that.

It must adhere to the Cloud Computing Security Guidelines provided by the Australian Government.

Any cloud hosting environment that is considered must satisfy the following parameters:

- **Access privileges** – Cloud service providers should be able to demonstrate that they enforce adequate oversight and access controls to enforce administrative delegation.
- **Regulatory compliance** – The cloud infrastructure provider should have systems in place to enable compliance and auditing and should be willing to undergo audits.
- **Data provenance** – The cloud infrastructure provider should be able to commit to specific privacy requirements.
- **Data segregation** – The infrastructure provider should guarantee complete data segregation to secure multi-tenancy.
- **Data recovery** – The infrastructure provider has the ability to do a complete restoration in the event of a disaster.
- **Monitoring and reporting** – The infrastructure provider should be able to ensure monitoring and reporting and provide tools to enable that for various administrators.
- **Data portability** – The infrastructure provider should not lock in the software or data deployed on its infrastructure. It should be possible to easily move to another cloud hosting provider if needed.
- **Hybrid hosting** – The infrastructure provider should be able to provide a hybrid hosting model if required. Due to the sensitive nature of data and possible requirements of different tenants it might be required to provide a solution that is a mix of private cloud and dedicated servers. Any data that has a privacy concern should not be stored or processed in a public cloud. The infrastructure provider should have the ability to provision a dedicated private cloud and a hybrid cloud.

The Assessment Platform will also need to support a number of deployment options ranging from fully online testing scenario to a fully offline testing environment. This section discusses hosting in various deployment scenarios and system components must be designed to enable these scenarios.

Please note that the deployment configurations may vary depending upon emerging requirements and the selection of the hosting provider. For example a jurisdictional data base might be needed in parallel with the central database for any reason such as improved efficiency or data separation. However, the key concepts illustrated in the diagrams shall remain valid.

There are three main scenarios. Scenario two can be deployed in three options. It is important to note that the design should focus on re-use of core components to enable these different scenarios. For example, the full local test server can be implemented as an extension of the content caching server and the app version can encase the core software used on the USBs.

## 11.1 Deployment scenario 1 – fully online

The following diagram illustrates an online test-taking scenario.

The system shows the key components and how they will be mapped to a generic cloud-hosting provider.

The other deployment options will depend on a fully online deployment for tasks such as retrieving test packages, downloading student information and storing student responses after tests.

In the fully online option, the web application is deployed across of a number of cloud compute instances. There is an elastic load balancer which increases and decreases the number of instances in response to the traffic. The system measures the traffic through another cloud-based monitoring service that sends alerts when the system needs to be scaled up or down. The data is also stored in cloud-based database servers that have a master slave replica configuration. All data reads for reporting purposes are performed from the replica server to the data warehouse.

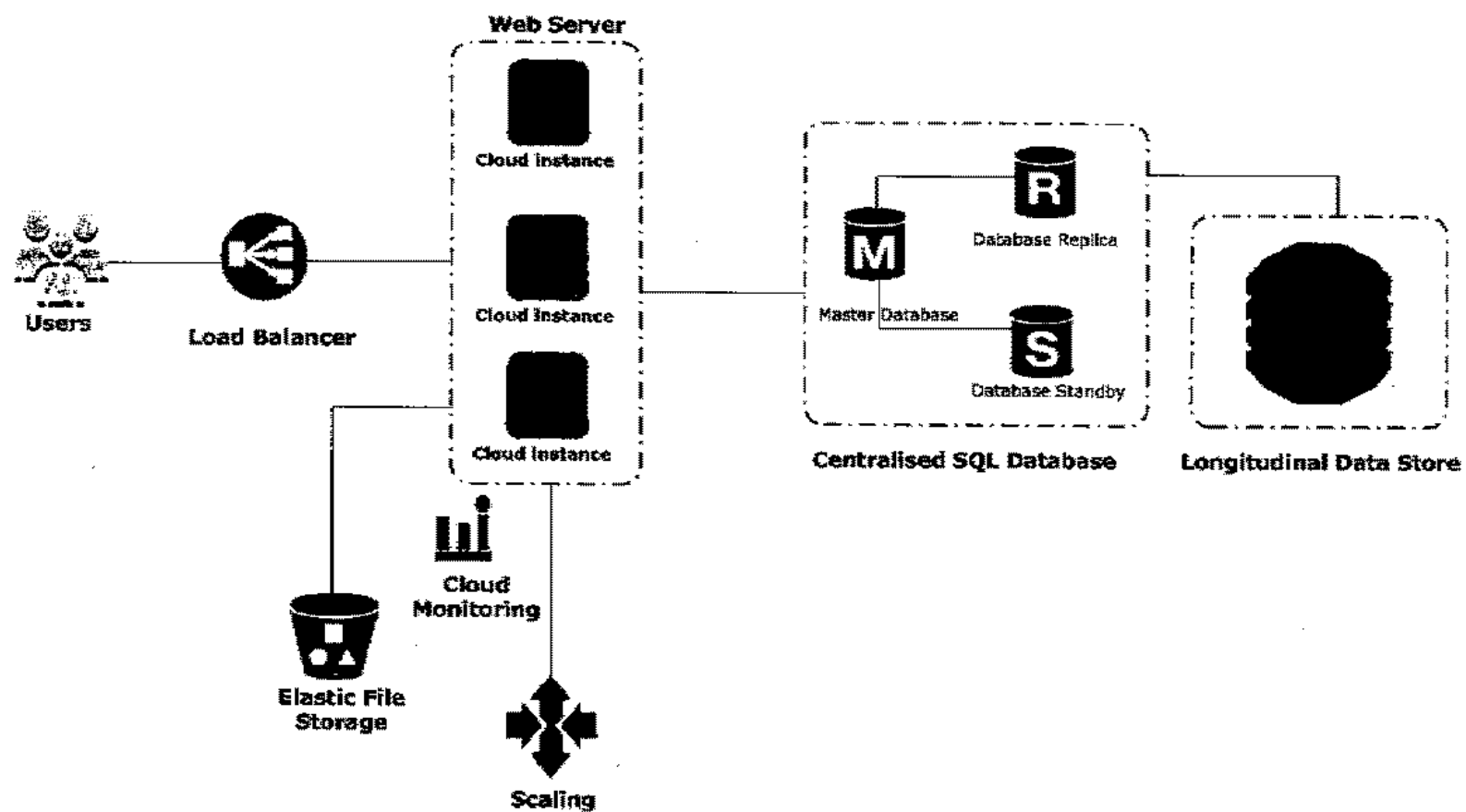


Diagram 21: Deployment scenario 1 – fully online

## 11.2 Deployment scenario 2.1 – cached at school local area network

This option is applicable for testing environments that have limited bandwidth. The bandwidth in this option is sufficient for authenticating and authorising students and sending responses to the assessment system, but is not enough for downloading the test content for multiple students at the same time while ensuring a low latency.

Therefore, this option provides a variance on the fully online scenario. Instead of connecting directly to the online system, students connect through a virtual content server that is downloaded and deployed on a server on the school local area network (LAN). Students are served the test content through the virtual content server and their responses are sent directly to the online system.

The system architecture therefore needs to have the ability to provide a virtual content server application that can act as an intermediary between the test takers and the online system.

The following diagram illustrates this option.

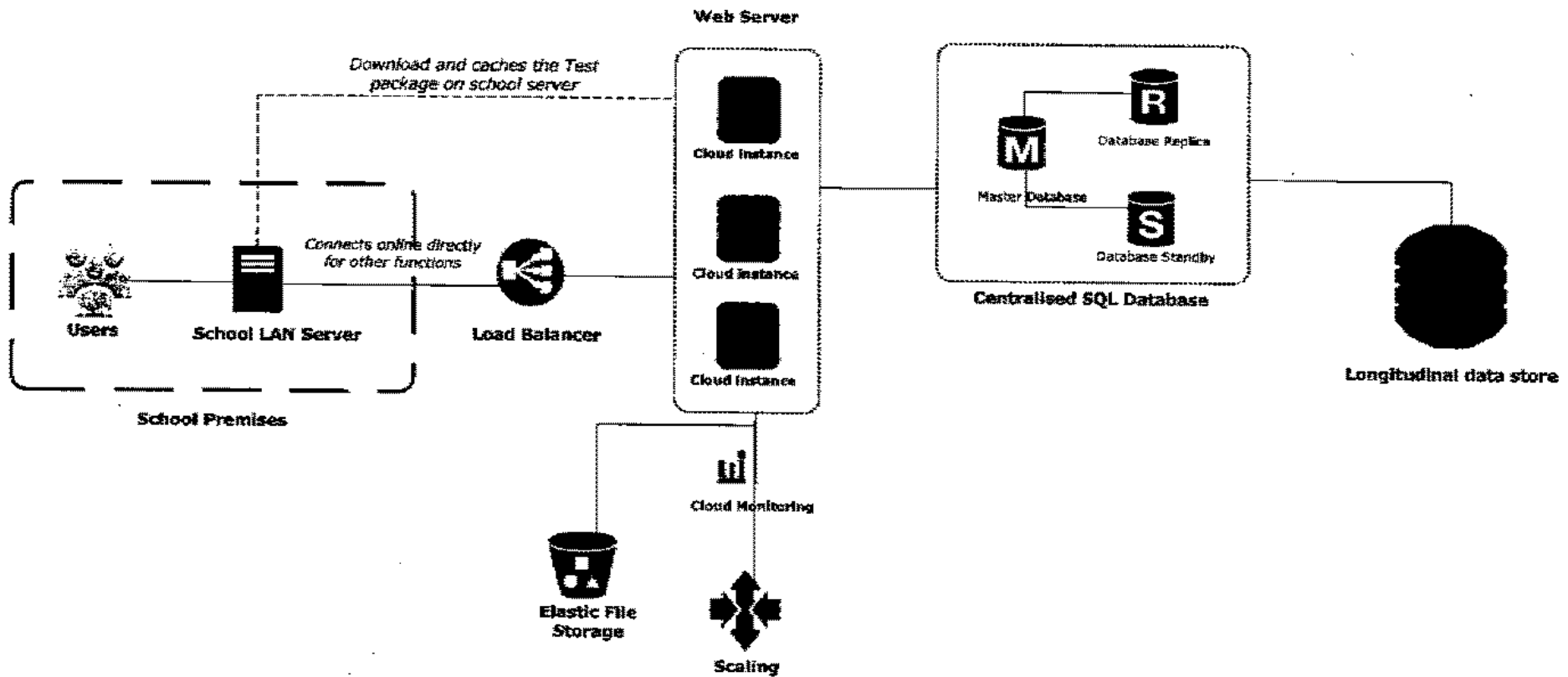


Diagram 22: Deployment scenario 2.1 – cached at school LAN

### 11.3 Deployment scenario 2.2 – local test server

This option is a combination of scenario 1 and scenario 2.1. The test application as well as the content is downloaded onto the school LAN server and students connect to the school LAN to take the test. If the school can provide a remote login, a jurisdictional administrator can also deploy the test server on the school's LAN. This will be helpful in cases where the school does not have sufficient administration resources.

At the end of the test event, the administrator can sync the entire offline database with the online database.

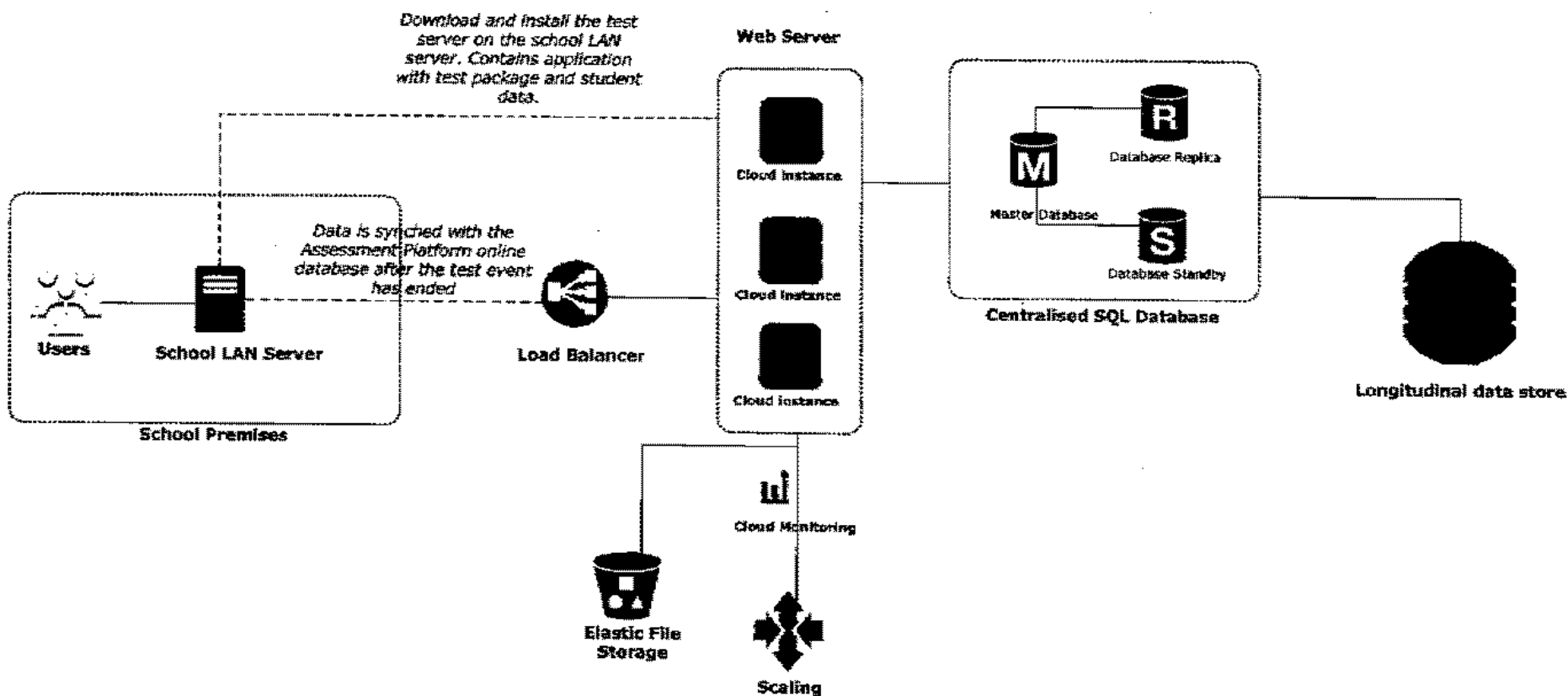


Diagram 23: Deployment scenario 2.2 – local test server

## 11.4 Deployment scenario 2.3 – offline (USB)

This option will support environments where there is no internet connection. With this option, schools will be provided with USBs that contain all applications and content to enable a test. Students will load the test directly from the USB and save it to the USB.

After the test event, schools will return the USBs to a central location where an administrator will sync it with the online database.

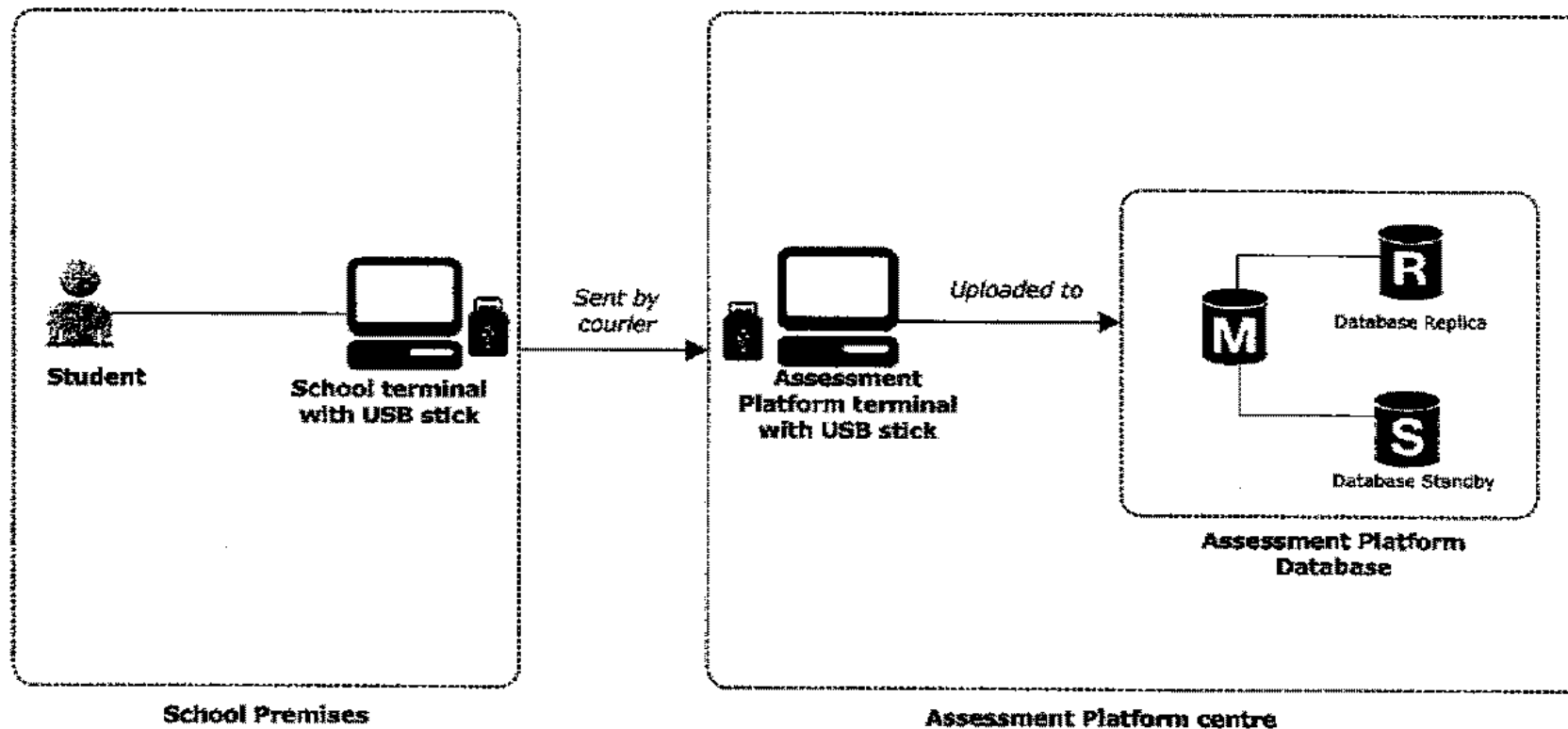


Diagram 24: Deployment scenario 2.3 – offline (USB)

## 11.5 Deployment scenario 3 – pre-installed on PC or tablet

In this option the entire test taking application is downloaded and installed on individual tablets or PCs. Students do not require a live internet connection during the test event. After the test event, the application syncs the student responses with the online database.

From a system architecture perspective this can be thought of as a modification of the earlier option. Instead of a virtual content server application on a server on the school LAN, the fully self-contained application now resides on individual tablets or PCs. The following diagram illustrates this option.

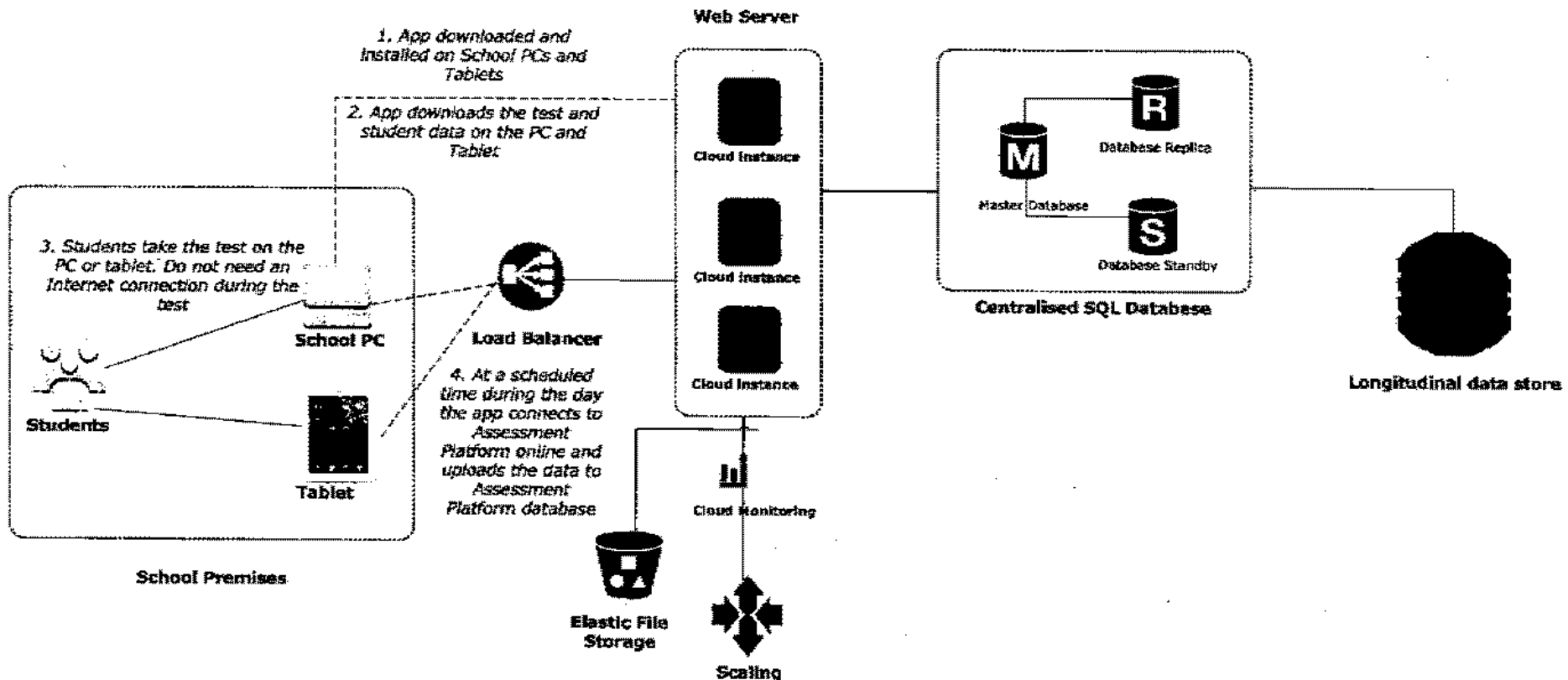


Diagram 25: Deployment scenario 3 – pre-installed on tablet or PC



## 12 Environments

The Assessment Platform will require a number of environments to develop and integrate all systems. Some of the key environments are specified in this section. Depending upon the project needs any other environments may be created.

### Development environment

The development environments are located on the individual developer machines and linked to a central source control repository. The development environments need to have the developer version of the applications required to develop and customise the specific application component. The developers must check in the source code to the repository at regular intervals.

### Test environment

The test environment is similar to the integration environment but will have its own test database. The test database will be created by the test team to accurately reflect the test scenarios.

### Staging environment

The integration environment will help to verify that individual components developed by the developers integrate with each other as required. This environment needs to have all software components installed.

### Production

After the components have passed adequate testing they will be released and deployed in a production environment.

### Training

The training environment is a replica of the production environment with its own associated database. It is a sandbox for users to log into and learn how to use the Assessment Platform.

The table below describes the contents of each environment and where it can be hosted.

Environment	Contains	Hosted
Development	Individual components being worked on by developer Development tools used by developer Development license	Locally All development environments to be connected to central source control repository
Staging	All components Development license for each component	Hosted on the same cloud infrastructure that will be used for hosting production environment

---

Environment	Contains	Hosted
Test	All components Test database Test or development license for each component	Hosted on the same cloud infrastructure that will be used for hosting production environment
Production	All components Production database Production license for each component	Hosted on cloud infrastructure
Training	All components except identity and access management Training database Training license for all installed components	Hosted on cloud infrastructure