# Document

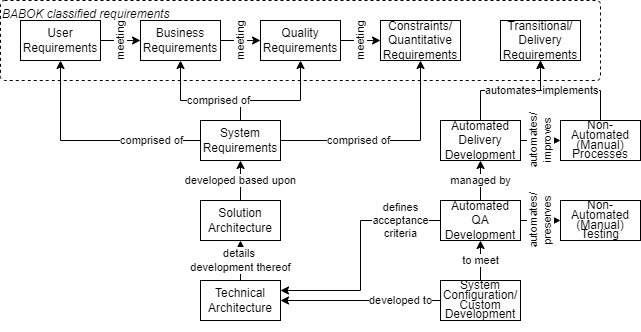
## Purpose

This document summarises the project’s key Quantitative Constraints in turn referenced by the project’s Quality Requirements.

## Context

This set of requirements fits within the Business Analysis Body of Knowledge (BABOK) requirements classification system (Business, User, Functional, Quality, Constraints and Transition requirements.

The totality of the Functional Requirements, Quality Requirements and Quantitative Requirements are referred to as the “System’s Requirements”, the basis of the Solution Architecture Description document.

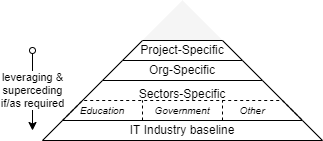


## Document Structure

In order to minimise miscomprehensions as to expectations, the document’s requirements are outlined in a specific sequence, categorised, structured and specified in a specific manner.

### Requirement Scopes

Requirements are organised according to 4 Scopes – Project-Specific, Organisation-Specific, Sector-Specific, Baseline/Generic, each expanding or superseding one or more requirements in a more general scope.



**Scoping as above is purposeful:** the delivery of projects is de-risked by avoiding developing requirements to define novel approaches to previously solved IT solutions, while being mindful of choosing ones that do not negatively impact the delivery of uniquely valuable business service features.

## Delivery Requirements Classification

Requirements within in each above defined Scope section are in turn organised according to the following delivery quality categories, covering both Delivery and System being delivered.  
System specific requirements are organised according to ISO-25010 classification:



To avoid duplication, scope sections do not require requirements for each ISO-25010 classification, instead relying on a more general scope.

## Content

Good practice dictates that requirements are SMART (Specific, Measurable, (pragmatically) Achievable, Relevant, Timely), developed in a CLEAR manner (Collaboratively, Limited-scope, Evaluated, Appropriate, Resource Conscience) manner. Refer to the Appendices.

### Prioritisation

Requirements are prioritised as follows:

1. **MUST** - requirements expected to be deliver as defined.   
   If technically *unable* to (e.g.: because the service is a **SaaS**), propose a work-around.
2. **SHOULD** - requirements expected to be deliver as defined, but alternative means to obtaining an equivalent outcome are acceptable.
3. **MAY** - represents requirements that -- time and resources permitting – would be ‘nice to have’ but are not considered essential functionality for the final solution.

### Exemptions

Not all solutions can reasonably meet all requirements that are marked as MUSTs.   
For example, proposed solutions may rely on the use of 3rd party SaaS service providers -- whom it is improbable will agree to modifying their service to meet project specific requirements. In such cases, it is up to the presenter to submit an endorsable work around that can meet the same obligations and/or objectives.

### Acceptance Criteria

Quantitative requirements are Measurable in their own right, therefore do not include accompanying Fit statements.

## Acronyms and Terms

Acronyms and terms used in this, and potentially reliant documents, are defined in the Appendices.

Key terms of specific meaning include:

* digital deliverables

# Qualitative Constraint Objectives

The following scope sections catalogue key quantitative objectives referenced by the project’s *Baseline System Quality Requirements*.

Although Qualitive statements are often embedded within Quality Requirements, there is value extracting them into a separate document, as we have done here, to provide an overall understanding of impactful quantities.

## Project-Specific Qualitative Objectives

The following catalogues key quality objectives specific to this individual project, building upon the Organisation Sector-specific Key Quality Objectives catalogued in the subsequent section.

### Accessibility

The system’s business service functionality is initially available to a small but expanding set of business service and consumer users.   
The proposed Service is to meet the needs of the final sets.

| Category | Subcategory | Value | Rationale and/or Notes |
| --- | --- | --- | --- |
| Users | Business | MOE | Create, Update, Manage Assessment Media & Forms |
|  | Partners | SMEs | Create, Update, Manage Assessment Media & Forms |
| Providers | Admin | Coordinate & manage access & allocation. |
| Teachers | Develop assessments. |
| Customers | Learners | Learners upload media for assessment. |
| Whānau | Assessors build relationships and recommend, based on assessments. |

### Reliability/Availability/Capacity

The service is to be used by a small number of users initially – business service users, assessment SMEs, teachers, potentially totalling 100,000 users. It is expected that Learners be added subsequently. Learner’s Whānau next. The final number of users are therefore equivalent to those covered in the Organisation scope section.

### Security

The confidentiality of the information maintained by a system impacts subsequent system design options that can be endorsed.

| Category | Subcategory | Value | Rationale and/or Notes |
| --- | --- | --- | --- |
| Data Classification | Resource | IN-CONFIDENCE | The classification of *individual* Resources the system is to manage. Note: In general records are for public consumption (UNCLASSIFIED), unless specified otherwise -- but as the system requires managing IN-CONFIDENCE records or documents, the highest level required is noted here, affecting subsequent system design choices. |
|  | Service | IN CONFIDENCE | The classification of the system as a whole. Note: The system is intended to hold UNCLASSIFIED individual resources,  but the volume of user Personally Identifiable Information (PII) demands the information be treated as IN CONFIDENCE.  References:  <https://protectivesecurity.govt.nz/home/information-security-management-protocol/new-zealand-government-security-classification-system/>  [http://www.gcsb.govt.nz/publications/th e-nz-information-security-manual](http://www.gcsb.govt.nz/publications/the-nz-information-security-manual) |

### Compatibility/Interoperability

The system must reuse existing organisation services where available to provide a more seamless, integrated service to consumers.

The following schedule outlines integrations specific to this system, and integration protocols.

| Category | Subcategory | Value | Rationale and/or Notes |
| --- | --- | --- | --- |
| Integrated Systems | DNS | sek | Environment are to be available as subdomains of the organisation’s DNS domains (note there is a separation for PROD-data to non-Prod-data). |
| Automated artefact collection & Assessment | Better start Literacy Approach (BSLA) | The base system is expected to link end users to 3rd party specialised assessment tools. |
| Protocols | End user authentication and event integration protocol | IMS Global’s LTI protocol | 3rd party digital assessment tools are to be integrated to provide a frictionless end user experience. An MOE ITC TWG endorsed protocol, such as LTI protocol, is to be used to achieve the objective. |
|  | Curriculum Description Protocols | IMS Global’s CASE protocol | Assessments are against progression pedagogical frameworks, expected to be described in machine readable format. An MOE ITC TWG endorsed protocol, such as CASE, is to be used to achieve the objective. |
|  | Assessment Questions Protocols | IMS Global’s QTI protocol | Assessments are to be shareable between assessment services and education resource repositories (OCH) in an interoperable, persistable, format. An MOE ITC TWG endorsed protocol, such as QTI, is to be used to achieve the objective. |
|  | Student Record Interchange Protocols | A4L’s NZ-SIF protocol | Results from multiple assessment services, including this one, will be persisted in a central system of record (SoR) (Te Rito). An MOE ITC TWG endorsed protocol, such as A4L’s NZ-SIF, is to be used to achieve the objective. |

## Organisation-Specific Qualitative Objectives

Digital Services provided by this organisation have a small set of specific requirements, building upon more general Sector specific objectives.

These organisation-scoped requirements do not change project per project.

### Governance

The delivery of deliverables is de-risked by early involvement with internal operational stakeholders, consensus, endorsement and reaching key governance targets.

Note:  
The following schedule outlines project governance requirements.

| Category | Subcategory | Value | Rationale and/or Notes |
| --- | --- | --- | --- |
| Key Stakeholders | MOE | Privacy Services | Group to work with to provide the Data Classification which in turns constrains system design choices. |
| Identity Services | To setup sector authentication via ESL |
| TPHM ICT Customer Support Services | Group which provides tier 1 support to internal and external system users. |
| TPHM ICT SPA (Strategy, Planning & Architecture) | Group which provides service and integration design services. |
| TPHM ICT Project Services | Group which provides Project Management of IT service deliverables. |
| TPHM ICT Assurance | Arranges 3rd party Security Assessments, as one aspect of it’s C&A process. |
| TPHM ICT Assurance – Change and Transition | Arranges collection of evidence from C&A process, Customer Support Services, Operations, Infrastructure, Web & Application Services to support an endorsement by CAB to support a decision by the Chief Digital Office to issue an ATO before permitting digital deliverables to be deployed to a PROD-DATA environment. |
| TPHM ITC-Operations & Infrastructure | Group which provides infrastructure and dependency service integration, including:   * project ALM management setup * DNS, Certs * Directory Services integration * cloud infrastructure automation and provisioning * Coordination of Integration with Organisation IT Services (SMTP integration, malware detection, SIEM, etc.) * Supports Organisation Business Services integration |
| TPHM WAS (Web & Application Services) | Web Application Services, primarily for: - Organisation Style Guidelines  - Organisation Website integration (media, redirection, etc.) |
| Endorsements | Business | EDK |  |
|  | ICT | ADM | System design must obtain and/or remain in alignment with ADM’s initial endorsement |
|  | TWG | The Technical Working Group must endorse Architecturally Significant Technical Design Decisions and subsequent Changes. |
|  | CAB | Endorsement from the Change Advisory Board of the Service’s Operability is required prior to the system obtaining an Authority to Operate (ATO) in a PROD-DATA environment.  **Important:** This in turn relies on  a) a successfully completed C&A process  b) involvement and written endorsement from key Stakeholder groups listed above |
| Governance |  | ITCGB | Endorsement of Strategic investment is required prior to funding |

### Deliverability

Although essential, the digital system being delivered is *not* the primary deliverable -- the actual key deliverable is a full lifecycle management service configured to automate the delivery of the configured above end user information service to multiple cloud environments.

| Category | Subcategory | Value | Rationale and/or Notes |
| --- | --- | --- | --- |
| Systems | UserVoice | JIRA | Unless superseded at a Project-Specific level,  Collection of User voice is collected and curated via a User’s SME Stakeholder, curated into the Stakeholder engagement service. |
| Stakeholder Desire engagement | JIRA | Discovery information is to remain available on ministry managed services for the service’s full lifespan. |
| Project Delivery Stakeholder Documentation | Confluence | Non-Technical Project and Business Services delivery information to be available on organisation managed services for the duration of the service’s lifespan. |
| Development  Work Item Management | Azure DevOps (ADO) | Technical Work item management is to be developed and available on organisation managed services for the duration of the service’s lifespan. |
| Digital Deliveries Documentation | ADO Wiki | Technical documentation is to be developed and available on organisation managed services for the duration of the service’s lifespan. |
| Source Version Control | Git (on GitHub or ADO) | Customisation and/or Configuration Scripting is to be developed and available on organisation managed services for the duration of the service’s lifespan. |
| ALM | Azure DevOps (ADO) | Used to manage Production Work Items (see above), Code Management, and automated delivery Workflow Automation (eg: Compilation, Packaging, Deployment, Configuration, depending on digital deliverables). |

### Functionality

The following schedule summarises key functionality expected of the digital service:

| Category | Subcategory | | Value | | Rationale and/or Notes | |
| --- | --- | --- | --- | --- | --- | --- |
| Service | | Groups | |  | | Note:  a key characteristic of the sector is that |
|  | | Role Management | | Group-Specific Permissions-Based | | Note:  a key characteristic of the sector user base is users may belong to multiple groups *and have different roles in each*. (a replacement temp may be Teacher in one, Admin in another higher one, Learner in yet another, Assessor in yet another, and Parent/Whānau member in multiple schools) |
|  | | Permission Management | | Permission based | | Note:  A defining characteristic of the sector is its being comprised of 1500+ individual organisations, each defining Roles to their own needs. In small schools Teacher Roles may require most Permissions to complete Admin tasks, while in larger schools, admin task Permissions may be allocated only to Admin Roles). Roles have proven over and over again to be too unwieldy to correctly model and therefore implement these differences per organisation. |
|  | | Auditing Management | | All operations, including Search and View | | Note: As a government entity, we are mandated to meet target NZISM auditability objectives. As such, we are obligated to have the tools in place to quickly investigate irregular activity, report breaches and provide information to quantify as accurately as possible potential impact. |
|  | | Removal | |  | | Note: As a government entity, we must provide the functionality to remove access to records by end users, while at the same time are obligated to keep all records within a service, without removal, using reversible logical state changes. Note that we also mandated to be capable of removing PII from reports and extracts, to meet Privacy Act objectives. |

### Interoperability

New systems are expected to integrate and interoperate with existing organisation services, in addition to sector specific services.

| Category | Subcategory | | Value | | Rationale and/or Notes | |
| --- | --- | --- | --- | --- | --- | --- |
| Integration Systems | | Compute Hosting Environments | | AWS or Azure | | If the digital deliverables are not SaaS based and Infrastructure is required, it is to be developed and delivered on organisation managed Cloud Infrastructure. |
| Data Hosting | | NZ, AU | | NZ citizen data, is to preferably stored in NZ ISO-27001:S2 compliant Cloud storage if available. Or AU.  In some cases, Māori specific data may require being limited to storage in NZ. |
| Discovery | | DNS (Non-Prod) | | The organisation manages DNS Servers for its non-prod-data environments (BT, ST, UT, etc.). |
|  | | DNS (Prod) | | The organisation manages DNS records for its prod-data environments separately to its non-prod-data (PROD) environments. |
| Notification | | SMTP | | The organisation manages its own SMTP server. |
| Identity | | Azure AD | | Integration with the organisation IdP/Directory Service is expected in order to provide a Single Sign On (SSO) experience for internal users. |
| Identity (Sector) | | Education Sector Logon (ESL) | | To Authenticate sector Provider users (e.g.: Admins, Teachers), the system must integrate with the organisation’s Education Sector Logon (ESL) service (built upon AAD). |
| Identity (Consumers) | | TBD | | To Authenticate sector consumers (Learners) and their whānau, a 3rd external IdP system is required. Important: old-school in-system credential storage is unendorsable. |
| Directory Services | | Azure AD | | The organisation’s cloud based AAD provides and authenticates service accounts for system component integration purposes. |
| Diagnostics & Errors | | (O)Organisation SIEMs | | The organisation uses a maturing range of SIEMs services to monitor services and provide Alerts to Operation and Security SMEs.  Collaboration with the SIEMs SMEs is required to choose an appropriate approach. |
| Data warehousing | | EDK | | Data warehousing is required for cross-system reporting.  Two Extracts (one with, one without PII information) to be made available by secure automation for subsequent importing into the organisation’s data warehouse managed by Education Data Knowledge (EDK).  Preferred ETL methods include periodical pulls, by invoking system APIs – alternative solutions (e.g.: legacy File Drops) require prior acceptance. |
| Reporting | | (I/O)Reporting Database | | Confidential information stripped (i.e. without PII) data will be required to be made available by secure automation for use within organisation reporting services.  Duplication to secondary databases via ETL using API is preferred, FileDrops are agreeable if need be.  Note: the organisation uses an evolving range of reporting services. Collaboration with Data Reporting SMEs is required to select and implement an appropriate solution. |
|  | | API Gateway | | API HUB | | A subset of this system’s data may be cached in the organisation’s API HUB. |

### Adaptability

The service is to be provided within multiple environments. With different access to data.

| Category | Subcategory | | Value | | Rationale and/or Notes | |
| --- | --- | --- | --- | --- | --- | --- |
| Environments | | Non-Prod-Data | | Built Test (BT) | | Automated Integration & QA Testing environment |
| System Test (ST) | | Non-automated/manual QA Testing environment |
| User Test (UT) | | Stakeholder Acceptance Viewing Testing environment |
| Training (TR) | | Non-production data resettable environment for training purposes |
| Prod-Data | | Pre-Prod Hot-Staging (PP) | | A temp prod-data deployment environment for hot-swapping routing with PROD. |
| Production (PROD) | | End user information environment. |

### Maintainability

If digital deliverables include code of any kind (configuration, customisation, custom development, scripting), they are expected to be maintainable by current organisation capability and reasonable market availability:

| Category | Subcategory | | Value | | Rationale and/or Notes | |
| --- | --- | --- | --- | --- | --- | --- |
| Tech Preferences | | Host Environment | | Cloud. Hosting provider must have ISO-27001 level 2+ | | This organisation already has enterprise-wide licenses with both Azure and Amazon, along with associated billing & maintenance processes. |
| Database/Store | | SQL Server | | Note: Only Applicable if digital deliverables include custom development of services.  To be able to encrypt at the Db, Table, Column, Row level as required by different Data Classification needs. Others are acceptable if the above are not required. |
| OS | | Endorsable Mainstream (Windows or Red Hat) | | Note: Only Applicable if digital deliverables include custom development of services.  The choice of OS is relevant due to a combination of organisation licensing agreements and current in-house capabilities. |
| Service Language Type | | Compiled | | Note: Only Applicable if digital deliverables include custom development of services.  Compiled services consume less operational resources, providing higher availability and costing less over the service lifecycle. |
| Service Infrastructure & Configuration Scripting | | Powershell on Windows Bash on Linux | | Deployment and Configuration Scripts as part of the digital deliverables are to be developed in languages this organisation and local available market has current capability in. |

|  |  |  |  |
| --- | --- | --- | --- |
| Vendor Support Response Times (mins) During normal business hours | P1 | 15 minutes | Expected. Negotiable. |
| P2 | 2 hours | Expected. Negotiable. |
| P3 | 4 hours | Expected.Negotiable. |

## Education Sector Qualitative Objectives

The following catalogues key quality objectives specific to the Education Sector as a whole, building upon industry common Baseline Quality Objectives outlined in the subsequent section.

These sector wide-scoped requirements do not change project per project.

### Reliability/Availability/Capacity

National sector news may lead to new digital services being quicky and broadly accessed for investigation and early judgement.   
The digital service is expected to be capable of meeting initial and subsequent usage patterns:

| Category | Subcategory | Value | Rationale and/or Notes | |
| --- | --- | --- | --- | --- |
| Reliability/Availability/Capacity | | | | |
| User base | Minimum User Base | 100,000 minimum Creators (ESL users + Org AAD users only)  inputing records/providing feedback.  Thriving systems grow to add learners and their whānau (+1m). | | Assumptions:  Note:   * 80,000 teachers, inclusive of:   + 55,000 teachers,   + 30,000 Early Learning teachers * 20 MOE users (business and operations) * 800,000 learners * 100,000 whānau   Although national public services do not often require being ready for use by all members of all user groups from day 1, the service must be able to amply meet initial needs and then dynamically grow to meet the needs of the full spectrum of users over the service lifespan.  Note also that although the initial planned user base may be smaller, the scope of functionality may increase over time to a larger ratio of the full potential user base. |
| Churn (New/Leaving service/Year) | 62,000 students 1,000 teachers | | Leaving/moving users do not release storage but are impacted by Offboarding obligations as per Privacy and Security policies and regulation (e.g.: implying that Roles should be Time allocated versus open-ended) |
| Changing school within system/year | Teachers:2000 Learners: 110,000 | | The number of changing conditions requires the service permit account self-management via User Profiles, to not add unnecessary workload to users, teachers and education provider admins. |
| User Groups | Min | Min:1000 Expected:14,400 | | Organisation objectives require the ability to group users separately (whether groups start with only a single user and never grow further is not relevant to organisation objectives).  Assuming:  Sector groups and organisations:   * 2500 schools, * 5000 early learning providers, * 4000 home schools, * 600 Tertiary organisations. * 850 playgroups * 200+ Kahuo Ako/Communities of Learning, grouping 1700+ schools. * 220+ Learning Support Clusters, comprised of 1800+ schools. * Unknown number of sports, learning, etc. groups (1000)   *Note:  Education Providers, in turn, may nest additional groups per subject, year, course, class.*  **Important:** The grouping of Users into one or more nested Groups and assigning them Group-specific Roles (as opposed to Service-specific Roles), is a defining characteristic of the education sector versus other environments (e.g.: a single enterprise environment where employees and invited contractors have a single defined role and belongs to a single HR group). |
| Media | Permitted | Yes | | Media uploading requires further Malware validation integration, finer permission design, storage and networking security and I/O design considerations. |
| Versions | 6 | | Assuming: 6 drafts versions for 3 published versions over service lifespan. |
| Average Size | 1Mb | | Ranging from tiny text to media rich documents to videos. |
| Documents | 5000 | | 2 per education provider |

### Compatibility/Interoperability

In addition to standard baseline integration needs required by most systems (including the Corporate website, SMTP, etc. listed further down), education sector systems have a common set of integrations:

| Category | Subcategory | Value | Rationale and/or Notes |
| --- | --- | --- | --- |
| Integration Services | Identity (Sector) | ESL | ESL is the sector’s designated authenticating IdP service for sector users (Provider Admins and Teachers). Note that ESL does not authenticate business service consumers (students or whānau), and secondary IdPs are required to be integrated. |
| Provider Records | FIRST | FIRST is the sector’s system of record (SoR) of Education Providers (i.e.: Schools) |
| Student Records | NSI | Note: Only Applicable if validation of a learner’s NSN is required functionality to support delivery of the business service.  NSI is the sector’s SoR for Students |
| Enrolment Records | ENROL | ENROL is the sector’s SoR for allocation of Students to Providers |
| Progress Records | Te Rito | Te Rito is the sector’s SoR for accumulating Student Progress reports |
| Curriculum & Resources | OCH | Note: Only Applicable if learning resource media storage is a required capability of the service.  The sector’s Repository for Learning Resource Media. |
| Protocols |  |  | The above system integrations are expected to require to be integrated using the following protocols: |
|  | FIRST | Proprietary/XML |  |
|  | NSI | SOAP/REST |  |
|  | ENROL | Proprietary/XML |  |
|  | Te Rito | Cmi5,NZ-SIF |  |
|  | OCH | IMG Global:CASE |  |

Note:  
The user base is large, and classes take place at different times of the day. There are not envisioned moments when the service is expected to be used by all users at the same time.

| Category | Subcategory | | Value | | Rationale and/or Notes | |
| --- | --- | --- | --- | --- | --- | --- |
| Throughput | | Surge Average Concurrent Requests/sec | | 560 client initiated user interface operations/per sec or 3000  API reqs/sec | | Use case examples:   * Assuming no more than 10% of user base being concurrent at same time over 25 seconds. * Mass Sector activities (e.g.: examinations):   + NCEA 1: 140,000 (14,000/25=560)   + NECA 2: 88,0000   + NCEA 3: 33,000 |

## Baseline Digital Service Qualitative Objectives

The following catalogue baseline key quality objectives, irrespective of Service or Sector (see above).

These industry-scoped requirements do not change project per project.

### Deliverability

| Category | Subcategory | | Value | | Rationale and/or Notes | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Deadlines | | First deployment to the  PROD-DATA environment | | 1.5 months | | Digital Deliverables must be securely deployed by automation to PROD-DATA environments for access by an authorised subset of users for user validation of whatever configuration and/or functionality is available at that point in time. Important: neither the business service nor deployment automation service is expected to be feature complete by this first deployment deadline -- the purpose of the requirement is to ensure that an prototypical automated deployment pipeline service is in place to iteratively develop further the orchestration of compilation, testing, packaging, deployment and host environment configuration. |
| Max Deployment Iteration | |  | | 2 weeks | | The duration is intentionally short to force a reliance from the start on automation workflows and remove reliance on unsustainable manual activities. |

### Functionality

The following schedule summarises key functionality expected of the digital service:

| Category | Subcategory | | Value | | Rationale and/or Notes | |
| --- | --- | --- | --- | --- | --- | --- |
| Service | | Groups | |  | | Note:  a key characteristic of the sector is that |
|  | | Role Management | | Group-Specific Permissions-Based | | Note:  a key characteristic of the sector user base is users may belong to multiple groups *and have different roles in each*. (a replacement temp may be Teacher in one, Admin in another higher one, Learner in yet another, Assessor in yet another, and Parent/Whānau member in multiple schools) |
|  | | Permission Management | | Permission based | | Note:  A defining characteristic of the sector is its being comprised of 1500+ individual organisations, each defining Roles to their own needs. In small schools Teacher Roles may require most Permissions to complete Admin tasks, while in larger schools, admin task Permissions may be allocated only to Admin Roles). Roles have proven over and over again to be too unwieldy to correctly model and therefore implement these differences per organisation. |
|  | | Auditing Management | | All operations, including Search and View | | Note: As a government entity, we are mandated to meet target NZISM auditability objectives. As such, we are obligated to have the tools in place to quickly investigate irregular activity, report breaches and provide information to quantify as accurately as possible potential impact. |
|  | | Removal | |  | | Note: As a government entity, we must provide the functionality to remove access to records by end users, while obligated to keep all records within a service, without removal, using reversible logical state changes. Note that we also mandated to be capable of removing PII from records, to meet Privacy Act objectives. |
|  | | Diagnostics | |  | | Note: To collaboratively provide service access to secured diagnostics is recommended. |

### Security

| Category | Subcategory | | Value | | Rationale and/or Notes | |
| --- | --- | --- | --- | --- | --- | --- |
| Hosting Environment | | Certification | | ISO-27001-Stage 2 | | Note:  Whether a SaaS or not, evidence the data centre used used limits and monitors all physical and remote access to logic and data. |
| Validation | | Hash Algorithms | | Min: SHA-3 | |  |
| Encryption | | Protocol Encryption Protocols | | Min: TLS 3+ | |  |
| Certificates | | Max Length | | 90 days | | Note: For Services hosted outside of the organisation’s cloud infrastructure (eg: on vendor cloud infrastructure) the following will require to regularly redevelop certs and deliver them to the vendor: a) an ability and agreement by the vendor to update the certs regularly b) a documented and security verified process  c) a secure organisation managed file transfer service  d) a budget  e) a agreed schedule (endorsed if it varies from the 90 days). |

### Compatibility/Interoperability

All systems require integration into standard services, irrespective of the project, organisation, sector.

| Category | Subcategory | | Value | | Rationale and/or Notes | |
| --- | --- | --- | --- | --- | --- | --- |
| Integration Systems | | Hosting | | Organisation  Cloud Accounts | | If the service can be organisation managed, it must be hostable on it’s Cloud Infrastructure of choice. |
| Discovery | | DNS | | The system must be discoverable on the WWW under a customisable environment and service based DNS domain name (e.g. “[*env.]yourservice.yourorg.tld”*). |
| Notification | | SMTP | | Notifications external to the system rely on email from a customisable DNS domain. |
| Malware detection | | TBD | | If the solution permits end users to upload media (images, pdfs, etc.), the service must validate the payload before persisting it. Note: the ability to integrate with an approved/licensed organisation provided malware service is preferred. |
| Identity | | One or more External  federatable Identity Providers (IdP) | | Endorsable Authentication IdP integration protocols include: - OIDC for Persons,  - OAuth for Services |
| Diagnostics & Errors | | (O)Organisation SIEMs | | Note: Sighting of Diagnostics MUST be performed during Security validation, to ensure confidential information (PII, etc.) is being cleansed before being recorded.  Subsequent access to Diagnostics Logs depends on Support Terms within Development and subsequent Support contracts. |
| Data | | (I) Provisioning | | Validated APIs to be provided to permit external services to orchestrate provisioning.  Note: provisioning by direct data storage inserts/update is not endorsable. |
| (O) Data warehouse | | APIs to be provided for external services to orchestrate invoking, to in turn develop extracts for datawarehousing are expected. |
| Integration Protocols | | Formatting | | JSON | | Note: Although XML is still supported, JSON is the preferred protocol when both are available. |
| Approach | | HTTPS REST | | Integrations are over the secure NET channels (HTTPS), using RESTful integration patterns. |
| Identity | | OIDC, OAuth, SAML | | Note: As discussed under IdPs, OIDC and OAuth are preferred. Legacy SAML is endorsable if required. |

### Reliability/Availability

| Category | Subcategory | | Value | | Rationale and/or Notes | |
| --- | --- | --- | --- | --- | --- | --- |
| Throughput | | Surge Average Concurrent Requests/sec | | 560 user interface requests per sec, or  3000 API req/sec | |  |
| Downtime | | Duration | | 20 minutes | | Assuming part of a lunch break. |
| Ratio/Fortnight | | 99.9% | | 20 minutes per fortnight. |
| Disaster Recovery | | Recovery Point Objective (RPO) | | Max 15 mins | | Iterative Backups are expected to not lose more than 15 minutes. |
| Recovery Point in Time (RPT) | | 60 mins | | A full restoration of a database should be a rare occurrence, and not take longer 3x time the permitted downtime. |
| High Availability | | Horizontal Scaling Up | | >50% over 120 seconds. | | Note: Only Applicable if digital deliverables non-SaaS/organisation hosted services.  These settings are if installed on cloud infrastructure. If not, equivalencies must be sighted. |
| Horizontal Scaling Down | | <33% for over 500 seconds | | Note: Only Applicable if digital deliverables non-SaaS/organisation hosted services.  These settings are if installed on cloud infrastructure. If not, equivalencies must be sighted. |
| Backup | | Full | | Every 24 hours | |  |
| Incremental | | Max 15 minutes | |  |
| Duration kept | | 31 days | | The duration must be mentioned to users in the Data Usage declarations, mentioned elsewhere. |
| Minimum Media Resources | |  | | 100,000 | | Assuming: Estimated number of individually managed media resources:   * 5,000 documents * 17 drafts spread over   3 published versioned |
| Minimum Storage (Gb) | |  | | Estimate Max 500 Gb | | Assuming:   * 7 years x 100,000 tests, x 3 times, x 0.25Mb   Note: The cost of Storage is cheap and should not be a deciding factor. The only deciding aspect is to ensure there is enough. |

### Performance

| Category | Subcategory | | Value | | Rationale and/or Notes | |
| --- | --- | --- | --- | --- | --- | --- |
| Response Time | | Peak Concurrent Requests/sec | | 12,000 requests per sec. | | Note: That said, in a large population, the throughput of eager users is considerable and unnecessary delays are not desired. |
| Max *Completed* Response Time | |  | | 80% <= 0.5 seconds  90% <= 1 second  95% <= 2 seconds  100% <= 5 seconds | | Note: excluding the downloading of media (video, large files, etc.), with few exceptions (yearly reports, etc.) System Operations must take less than 0.5 seconds. *Note:  latency is always a problem. Please state strategies to minimizing this problem, which may include minimising the number of requests by using a SPA interface (as opposed to an MPA architecture), combined with bundling imagery, styles and scripts, caching, CDN, asynchronous requests – especially database calls.* |

### Resource Usage

| Category | Subcategory | | Value | | Rationale and/or Notes | |
| --- | --- | --- | --- | --- | --- | --- |
| Client Memory | | 25Mb | | Per Interface instance/tab | | Note: Client-side interfaces must not require unusually client device resourcing (i.e. atypical costs) – or potentially lead to difficult to diagnose and correct error reports. |
| Client CPU | | 10% | | Interfaces should not consume excessive CPU at rest. | | Note: Same. |

If the Digital Deliverable is to be hosting on organisation managed infrastructure as a separate cost, server resource usage is an important cost factor over the overall service lifespan (managed SaaS offerings may ignore these qualitative objectives):

| Category | Subcategory | | Value | | Rationale and/or Notes | |
| --- | --- | --- | --- | --- | --- | --- |
| Server Memory | | 2Gb | |  | | Note: Only Applicable if digital deliverables non-SaaS/organisation hosted services.  Beyond system code base itself, and caching, correctly developed stateless services should not require atypical memory. |
| Server CPU | | 25% | | See HR settings. | | Note: Only Applicable if digital deliverables non-SaaS/organisation hosted services.  Same |
| Db Server CPU | | 4 | | Preferably 2. | | Note: Only Applicable if digital deliverables non-SaaS/organisation hosted services.  This constraint may be removed if DB Server licensing cost are not impacted. |

### Maintainability

If parts of the digital deliverables are coded configuration, customization or custom development, the maintainability of the deliverable is an important cost factor.

Note:  
If no code is required (i.e., the digital deliverables are a SaaS only configurable by User Interface) the following qualitative objectives can be ignored.

|  |  |  |  |
| --- | --- | --- | --- |
| Category | Subcategory | Value | Rationale and/or Notes |
| Infrastructure | Host Environment | Scriptable | Note: Only Applicable if digital deliverables include custom development of services.  It is expected that infrastructure be created, deployed, configured by scripted automation in pipelines (using Infrastructure as Code). |
| Relational Data Store | SQL Server preferably | Note: Only Applicable if digital deliverables include custom development of services.  To support encryption at the Db, Table, Column, Row level as required by different Data Classification needs. Other solutions are acceptable if all cases of the above are not required. |
|  |  |  |
| Service Infrastructure & Configuration Scripting | PowerShell on Windows, Bash on Linux | Deployment and Configuration scripts are to be in languages both organisation and market has current capability in. |
| System | Service Development Framework | Mainstream, Top 5, Actively Supported | Note: Only Applicable if digital deliverables include custom development of services.  Supported Frameworks provide more security over the supply chain. Faster frameworks consume less resources over the service lifespan. See: https://hotframeworks.com/ See: https://web-frameworks-benchmark.netlify.app/result |
| Service Development Language Type | Mainstream, Top 5, Compiled | Note: Only Applicable if digital deliverables include custom development of services.  Compiled servers in PROD consume less resources, therefore cost less over the service lifecycle. See: https://www.tiobe.com/ |
| Service Client | Service Client Framework | Vue.js, Angular, React  Electron or equivalent | Note: Only Applicable if digital deliverables include custom development of service clients (interfaces).  SPA based architectures require less server resources than MPA architectures, while providing the benefits of having to develop according to API-First principles. |
| Service Client Language | Typescript preferably | Note: Only Applicable if digital deliverables include custom development of service clients (interfaces).  “Transpilable” languages demonstrably reduce error count, while increasing maintainability. |

Specific to cases when digital deliverables include custom coding (e.g.: infrastructure as code scripting, database as code, system configuration scripting, service or client logic) the code must be developed to quantifiable maintainability metrics to diminish maintenance costs.

|  |  |  |  |
| --- | --- | --- | --- |
| Category | Subcategory | Value | Rationale and/or Notes |
| Code Maintainability | Cyclomatic complexity | 80% < 5 100% < 10 | Note: Only Applicable if digital deliverables include custom development.  A metric of the complexity of the code.  Max <10. Preferable <=5. |
| Inheritance Depth | Interfaces: 80% < 3, 100% < 6  Classes: 80%<20, 100% < 5 | Note: Only Applicable if digital deliverables include custom development.  Inheritance *is* Coupling, decreasing Modularity and Maintainability. |
| Max Lines/Code Function | 80% <=20  100% <=60 | Note: Only Applicable if digital deliverables include custom development.  Short functions improve modularity, clarity, therefore maintainability |
| API  Code Coverage | *>= 100%* | Note: Only Applicable if digital deliverables include custom development.  All APIs endpoints must be tested (“covered”) for applicable use cases – thereby (by implication) calling all other reachable and relevant code. |

# Appendices

## Acronyms and Terms

### Functionality Objectives

Functionality defines the operations by which users can expect to interact with the service.   
The list of functions is characteristically composed of two subgroups:

* system operation functionality, required to keep the system functional, and
* end-user functionality, required by business service provider users and business service consumer users.

### Quality Objectives

The quality of a system is the degree to which the system satisfies the stated and implied objectives of its various stakeholders.

The ISO-25010 quality model defines which quality characteristics (security, functionality, adaptability, maintainability, etc.) to considered when evaluating the characteristics of a software service.

The Qualities are defined as Quality Requirements, defined elsewhere.

### Quality Objectives

The amount or degree to which the Quality Requirements must be adhered to are defined as Quality Objectives.

This document lists these Quality Objectives.

### System of Record

An authoritative data source for records shared between multiple systems.

### **SaaS**

“Software as a Service” is the industry term for Software that is Subscribed to, in return for vendors Managing the infrastructure, Operating Service, component Services, etc. to disclosed or separately agreed Quality standards – requiring the account holder/customer only manage simple, non-customising, operational tasks such as Configuration, Provisioning, etc.

### Configured Software

SaaS and installed Software which only require configuration via User interface operations to manipulate System Settings.   
Generally speaking, if the system’s functionality is sufficient and fit for purpose without Customisation, the cost benefit of the approach is considered more valuable than Customised Software.

### Customised Software

If a system needs modification of its code – as opposed to modification of its Settings Data -- to become sufficiently fit for purpose, then -- whether the software modifications are small or large –it is considered as Customised. Customised software is generally installed within an Organisation Managed environment – but can also be a Customised SaaS.

### **Customised SaaS**

Covers SaaS subscriptions where the vendor and/or other parties has been contracted to add Customisation to their default SaaS offering.  
Although remaining installed on infrastructure managed by the vendor, this generally implies it is installed in a dedicated vendor-managed environment.

### **Custom Developed Software**

Software that is developed for purpose from industry development frameworks.

### **Digital Service**

The umbrella term covering the procured digital services, whether they be SaaS, customised SaaS and Custom Developed Software services.

### **Service**

Depending on context, refers to one of several services -- the client facing *business services* themselves, generally comprised of people processes relying on automated functionality, provided by procured *digital services*, which are developed, customised, configured, deployed, supported and maintained by *ITC* *operational services*, which in turn rely on automation provided via *ALM & deployment services*, which in turn relies on a *cloud infrastructure services*.

### **Digital Deliverables**

The umbrella term covering the delivery of any and all Configuration and the Digital Service (whether it be SaaS, Customised SaaS, or Custom Developed SaaS or any variation thereof) required to provide digitally automated business service to end users.

### Digital Delivery Service

The automated of the service of delivering Digital Deliverables. Not to confuse with the smaller Delivery Pipelines on which it in turn relies on. Involves the collecting Desires, first Defining them as achievable Quantifiable objectives, then Defining them as Development Work Items, Developing Digital Deliverables as per the Work Items, Deploying theses via a Delivery Pipeline for Automated Testing first, then whatever is not automated, via Manual Testing, and finally Stakeholder feedback before release to PROD-DATA environments.

### Organisation Hosted/Hostable

If a digital deliverable is not a SaaS or customised SaaS, and is to be hosted on-prem/managed data centre or on cloud infrastructure, then the digital deliverable is considered to be Organisation Hostable.

## Requirements

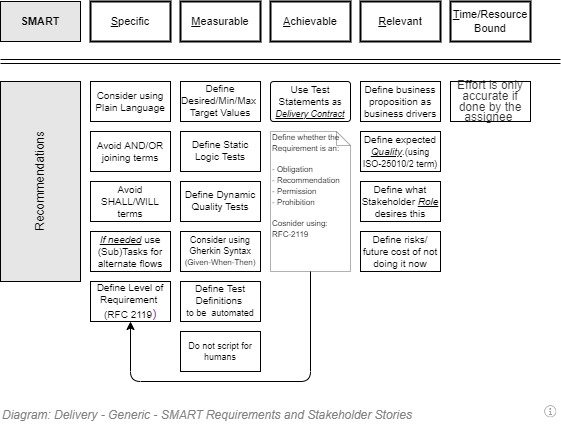
### Valuable Requirements

Projects are de-risked by planning of effort based on designs based on forethought, encoded as high value requirements.

Requirements are increased in value by being SMART, developed CLEAR-ly.

### SMART

Requirements benefit from being developed as SMART requirements.



### CLEAR

Requirements benefit from being developed in a clear manner.

