Plan Ceibal

INTERNATIONAL PUBLIC TENDER – Language Platform

TECHNICAL ANNEX

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1. AIM

Acquisition of a digital language teaching platform, as a “finished product” in SaaS mode (content included), aimed at students and teachers with a focus on the Second Cycle of Primary and Secondary Education.

The main objective of the tool is to make available to teachers and students, resources and activities that enrich the processes of teaching and learning of reading, writing and speaking both inside and outside the classroom, therefore the amount and diversity of Available materials (in topics and levels) is especially valued. The aim is to acquire a product that allows teaching to be personalized according to the students' own competences. Offers for custom developments will not be accepted. The quality of the web experience will be evaluated, in particular the navigation and content offered.

The minimum time horizon that Ceibal is able to guarantee for a contract is 3 years, provided that the project is successful in its first year of implementation. Each bidder must present its offer in accordance with the specifications of section 7.

OFFER. Centro Ceibal reserves the right to reject an offer that is not presented in accordance with this quotation and price scheme.

2. INTRODUCTION

A platform is sought for the language area, with content included, focused on learning and teaching the discipline for the Second Cycle of Primary and Middle Basic Education (students aged between 9 and 15 years). It must ensure a meaningful learning experience, through relevant and appropriate proposals to the Uruguayan educational program.

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The content within the platform may include interactive digital content, readings, audiovisual material, among others. They should be aimed at the target audience, not being mandatory, but desirable, to have content for lower or higher levels. It is important that students can find a guide in the tool itself that guides them, that follows their level and that helps them to advance in their language learning.

At the same time, it seeks to support the teaching work, providing a tool that allows them to accompany their students from their particular skills and needs, serving as a source of relevant information for the monitoring and efficient management of their students' learning.

It seeks to acquire a tool focused on the user experience, being a priority its usability and ease of appropriation by the target audience.

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3. FUNCTIONAL REQUIREMENTS

This section describes the requirements for the desired product.

3.1. MANDATORY REQUIREMENTS

3.1.1. Usability

Friendly, intuitive and easily appropriated by users. The interface and user experience should be appropriate for the role (teachers) and the age range of the target audience (9-15 years).

3.1.2. Contents

3.1.2.1. Levels and themes

The content on the platform must cover the curricular proposal of teaching language in Second Cycle of Primary and Secondary Education, with content that encompasses the dimensions and skills (speaking, listening, reading and writing) to be developed within the discipline, from a communicative approach and in compatibility with the teaching methodologies used by the Uruguayan educational system.

Documento Base de Adaptación Curricular CEIP
Programas 1er. año, Ciclo Básico, Reformulación 2006.
Programas 2do. año, Ciclo básico, Reformulación 2006.
Programas 3er. año,Ciclo Básico, Reformulación 2006.

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3.1.2.2. Variety of formats and modalities

The contents can offer a combination of interactive materials, flat, visual and auditory readings, adapted to the needs of each grade or level of difficulty in which they are presented.

Both content and activities must involve the development of knowledge and promote the analysis of the processes that allow the construction of knowledge.

3.1.2.3. Order and sequencing

The materials must present various levels of difficulty, starting from basic levels and progressing to more complex levels that ensure that students master the topic (s) raised.

3.1.2.4. Adaptation to the target audience and theme adaptation

The materials must be appropriate to the pedagogical needs of Uruguayan students responding to the principles of gender equity, aged approximately between 9 and 15 years. The contents must cover various topics that are addressed in the educational system of our country and be culturally appropriate and diverse, especially in terms of inclusion and non-discrimination of any kind.

3.1.3. Autonomous Use

A tool is sought that can be used by the student autonomously, to carry out their own journeys and set personal learning goals without completely depending on the participation of the teacher.

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3.1.4. Possibility of producing student texts

The materials must favor active learning and allow the accompaniment of different modalities, competences and levels of knowledge of the students. A tool is sought to motivate oral and written production, which invites the student to be a creator of texts.

3.1.5. Monitoring and personalized feedback on student progress

The platform must include functionalities so that teachers can manage information and make personalized feedback on the evolution of their students' learning processes, according to their interests, both at the group and individual level.

3.1.6. Personal monitoring and student activity

In turn, each student should be able to monitor and resume their own activity and progress throughout the school year.

3.1.7. Users and profiles

The tool must support the configuration of different user profiles and permissions. At a minimum, the following profiles are required:

- Student: For the children who will use the platform.
- Teacher: For tutors in charge of classes with children.
- Administrator: for Ceibal staff who will be in charge of providing support to end users, as well as for general administration. Ease and independence are sought for Centro Ceibal to access and operate, through users with this profile, information about the users, students and teachers registered on the platform, as well as their enrollments, interactions and progress, without requiring the continuous intervention of the provider.

The platform must function taking into account the following characteristics of the educational system:

- Teachers and students can be in more than one school and class.
- Teachers and students may change schools and classes repeatedly throughout the school year.

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3.1.8. Language

The platform must be available in its entirety in the Spanish language at the time of implementation, preferably in *rioplatense* Spanish or neutral Spanish.

3.2. DESIRABLE REQUIREMENTS

3.2.1. Contents

3.2.1.1. Other levels

It will be valued that the platform has content for lower levels (Primary) or higher (Upper Middle Education) than those indicated as a mandatory requirement.

The possibility of having texts adaptable to the students' reading level (simplified or enriched texts) will be valued.

3.2.1.2. Curricular Mapping

It is important that the platform allows the possibility of reorganizing the content according to the national language programs and the pedagogical autonomy of the teacher. Centro Ceibal will be in charge of mapping the available content and the bidder will be in charge of recording said classification or link on the platform.

3.2.1.3. Adaptability

The adaptive component of selection and correction of activities to suggest to students through artificial intelligence will be especially valued.

3.2.1.4. Accessibility

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The visual and auditory accessibility functions aimed at reducing barriers in the access and interaction of users with the proposed content will be valued.

3.2.2. Materials for teachers and lesson plans

The proposal may include guides for the use of the platform in class, and available lessons, specifically intended for teaching users of the platform. In particular, it will be assessed whether Ceibal can modify these contents or reorganize them as it deems necessary.

3.2.3. Content distribution

Possibility for Plan Ceibal to customize the content to send, individually or in batches, to groups of users. For example, sending the users of each grade the set of contents of the platform corresponding to the grade.

3.2.4. Connection with *Biblioteca País*

Plan Ceibal has a digital library with more than 8,000 titles where you can find the books recommended by the Uruguayan educational system. Any type of connection in the form of integration or recommendation of library contents will be highly valued. For further information: https://www.ceibal.edu.uy/biblioteca.

Temporary access to *Biblioteca País* with a teacher and student profile may be requested by the email compras@ceibal.edu.uy

3.2.5. Offline content for web & app solution

The possibility of accessing a part of the contents and functionalities of the platform remotely and without the need for an Internet connection will be assessed. Rural schools in Uruguay have various connectivity solutions that in some cases do not allow continuous

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and sustained work online. To serve this audience it is required a tool that allows access and offline work to some extent.

In case of including this functionality in web mode, keep in mind that it must work in the following operating systems: Linux (Ubuntu 16 distribution onwards), Chrome OS and Windows 10.

3.2.6. Other users and profiles

3.2.6.1. Parents/Guardians

It is desirable that the platform allows parents or guardians to monitor the progress of students.

4. NON-FUNCTIONAL REQUIREMENTS

4.1. MANDATORY REQUIREMENTS

4.1.1. Authentication

The platform must be integrated with Ceibal's centralized login system using the CAS protocol (version 3.5.3 and higher). For further information access https://wiki.jasig.org/display/CAS/Home

4.1.2. Users provisioning

The platform must provide a mechanism for loading users, profiles, classes and enrollments (that is, linking users in classes), considering that the data updates are daily.

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This mechanism can be done through REST services or automatic processing of CSV files. Whatever the option, it must be able to process the daily news of users within the same 24 hours.

4.1.3. Web compatibility

The platform and the contents must work correctly in the latest versions of the three most common browsers: Google Chrome, Mozilla Firefox and Microsoft Edge.

The platform is required to adapt to different screen orientations and dimensions (making it responsive).

4.1.4. Web Technology

It must be specified if a browser-level plugin is required to run the application. It is a requirement that the technologies used at the client level are current. As an example, products developed in Adobe Flash will not be admitted.

4.1.5. Compatibility with devices

4.1.5.1. General Compatibility (laptops and Android tablets)

The platform must guarantee a good user experience, both on laptops and tablets, either in a responsive web format or a specific application.

In case of offering a mobile application, the provider must allow Ceibal to distribute it through its application repository and include it in the software images developed for its devices, providing Ceibal with the corresponding application (apk).

4.1.5.2. Compatibility with devices delivered by Ceibal

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The web platform and the contents must work correctly on the devices delivered by Plan Ceibal, in Google Chrome versions 76 and higher.

The behavior of the tool will be evaluated on Ceibal devices delivered to the target audience of the platform, taking into account, among other aspects: adaptation to the size of the screen and their performance. The equipment list is as follows (for further information access https://www.ceibal.edu.uy/es/dispositivos)

- Sirio
- Murzim
- Clamshell SF20BA
- Clamshell SF20PA2
- Clamshell SF20PA3
- HP - Stream
- Tablet T10 - A102
- Ácrux

4.1.6. Functioning conditions

The offer must include the minimum specifications that must be met, both in terms of devices (processor, RAM, etc.) and Internet access (upload / download bandwidth, delay, jitter, etc.), to obtain a good experience in using the platform.

4.1.7. Automated export of usage data

Centro Ceibal, as Responsible for the database of the platform to be acquired, requires access to all the data of said platform corresponding to Centro Ceibal (not other clients of the provider).

Considering that the platform to be acquired will manage personal data, the definition of data considered for this section is the one established in ANNEX IV: SECURITY, CONFIDENTIALITY AND DATA PROTECTION.

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It is expected that the submitted proposal will allow:

- to access all data generated from user activity and all those necessary to understand said activity (for example, referential data or relational tables), both structured and unstructured
- to access raw records without transformation (including their temporary identification) or with a level of aggregation according to the use intended by Ceibal (for example, operational information, investigations).
- to access to data at a non-expensive cost (this point will be evaluated in a broad sense, refers to monetary aspects, priced within the costs of implementation, and efforts), that secure standard exchange methods are used, for example: SFTP , AWS, database access,
- integration through the number, type and country of the user's document.

It is understood that the platform may not have this functionality in the requested scope, for these cases, the presentation of the following two items will be considered valid:

- provisional or partial functionalities that allow access to priority data and that secure standard exchange methods are used, for example: SFTP, AWS, database access,
- a work plan to have the requested scope in the short and medium term (it will be taken as part of the eventual contract).

Since it is not possible for Ceibal to evaluate the completeness of the data, the only exhaustive lists that will be considered valid will be the exclusive ones (that is, when the proposal explicitly mentions that certain data will not be exported). For the rest of the cases, the commitment will be assumed to provide all the data (that is, the mention of specific data will be considered merely illustrative).

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See ANNEX III: PROPOSED CONTENT OF DATA EXPORT

4.1.8. SLA – Service Language Agreement

The offer must include a description of the level of service proposed, including:

- A description of the service being provided: which areas are included in the service and which are the responsibility of Ceibal.
- UpTime: Percentage of uptime, and maximum limits for service interruptions. Plan Ceibal requires an uptime of at least 99%.
- Problem notification procedure: who can be contacted, how problems will be reported, procedure for escalation and what other measures are taken to solve the problem efficiently
- Incident response time: average response time, resolution and recovery from failures; distinguishing different levels of criticality to be agreed with Ceibal.
- Monitoring and reporting: who is monitoring performance, what data is collected and how often, and how Ceibal accesses performance statistics (preferably in real time).

Ceibal may negotiate with the successful bidder the characteristics of this agreement, including penalties for non-compliance.

It is also requested to describe the work methodology to inform and validate the management of changes (functional and technical) in the platform that may affect Ceibal's operations, for example at the level of compatibility with devices or integration with other systems.

4.1.9. Information security, Confidentiality and Data protection

The bidder must complete the table in the Annex IV: SECURITY,

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CONFIDENTIALITY AND DATA PROTECTION on the requirements described.

In the event that Ceibal requires it, material that accredits what is stated in this compliance matrix must be available and presented. As an example, some documents that could be requested are detailed below:

- Backup test set and disaster recovery plan for cases in which the solution is provided in SaaS mode.
- Certification that accredits the physical location of the data in accordance with the regulatory requirements of territoriality.
- Architectures and protocols used.
- Privacy policy and terms of use of the platform.

4.2. DESIRABLE REQUIREMENTS

4.2.1. Users provisioning

It will be valued that the mechanism for loading users, profiles, classes and enrollments referred to in point 4.1.2 is through the API REST provided by Ceibal, which returns the information of the users (names, surnames, etc.), profile, and enrollment in classes.

4.2.2. Devices Compatibility

4.2.2.1. General Compatibility (cellphones and iOS)

The correct functioning at the level of usability and user experience on Android cell phones

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and the iOS operating system (cell phones and tablets) will be assessed.

In the case of offering an application, it will be valued that it remembers the user's credentials once they log in and do not ask them to authenticate again unless the user has closed the session. Likewise, it will be valued that the application is available in Google Play and App Store stores for download on personal devices.

4.2.2.2. Compatibility with devices delivered by Ceibal

In the event that content is offered for levels higher or lower than the mandatory ones (more developed in the section "Other levels"), Centro Ceibal considers it valuable that the product is compatible with the devices delivered to the beneficiaries of said levels.

The behavior of the tool will be evaluated in Ceibal devices delivered to the public to whom the contents of the platform are directed, taking into account, among other aspects: adaptation to the size of the screen and their performance. The list of equipment delivered for beneficiaries of other levels is as follows (for further information access https://www.ceibal.edu.uy/es/dispositivos):

- Tablet T8 U800_B
- Tablet Kiland T8 - TAB82_B_A
- Betelgeuse

Good performance will be assessed on devices with Android operating system 7 onwards and on different tablet screen resolutions (8 'onwards).

4.2.3. Hosting from fixed IP for data exoneration

It will be valued that the service is hosted from a finite number of fixed public IPs since this condition is essential to ensure the total exoneration of the costs associated with the platform's Internet traffic for users who are in Uruguay.

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4.2.4. Availability of environment for testing

It will be especially valued that the platform has an environment or instance of tests or sandbox, which allows to carry out complete tests of the system and interoperability with Ceibal applications, without any impact on the productive instance.

5. INTELLECTUAL PROPERTY

The Company that is awarded is obliged to grant Centro Ceibal an authorization of use that is non-territorial, non-exclusive, and for the duration of the contract, for access to the platform, developments, materials, etc., in the terms provided in point 7.1., as well as to reproduce, distribute, publish, communicate to the public, modify them, and create derivative works from it and the materials and pre-existing work, for the sole purpose of complying with the requirements of the agreement that the parties celebrate.

The successful tenderer assures Centro Ceibal that the platform, the developments, the materials, etc. acquired will be original and do not infringe any intellectual or industrial property rights of third parties, including, but not limited to, copyrights, trademarks and other distinctive signs, invention patents, utility models, industrial designs, trade names, names of Internet domain, trade secret, or undisclosed information, image rights or similar legal assets, and that are not encumbered, subject to inhibition or affected in any way that affects their free availability by Centro Ceibal. Likewise, the Company assumes full responsibility for legal actions and / or claims of any nature - including, but not limited to, extrajudicial, judicial, civil, criminal or administrative claims - that may arise as a result of the use of the software and content offered, and will be liable for damages, fines, penalties, costs, attorney's fees, expenses, and any other losses that may affect Centro Ceibal for such reason.

6. IMPLEMENTATION PROJECT

6.1. PROJECT PLAN

The offer must include a project plan for the implementation of the platform, as well as training in its administration and operation, which includes the following points:

- Work methodology.
- Detailed schedule.
- Testing plan.
- Plan to adapt or organize content
- The following documentation must be submitted at least
    - User manual for all user profiles included in the tool (administrator, teacher, student, etc.)
    - System requirements for all components of the solution.
    - Dictionary of all the data generated by the platform.

The platform must be operational by the beginning of the Uruguayan school year 2021 (March 2021), as long as it is awarded at least 90 days prior to this date. In case of not meeting the previous deadline, the parties will agree on the implementation schedule.

6.2. TRAINING

A training plan must be proposed to the administrators, technicians and officials that Ceibal considers, in order to acquire the knowledge for the correct operation of the platform.

A maximum of 10 people are contemplated who will receive the training, among the different profiles. Training can be face-to-face or remote.

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7. EVALUATION

7.1. TEST USERS

Trial users (at all levels and profiles) are required so that Centro Ceibal can evaluate the tool, verify its benefits and compliance with the requested requirements, prior to the award. Centro Ceibal may request the bidder technical assistance during this process.

7.2. DEMO

Centro Ceibal may request a demonstration of the solution, in person or remotely, after the opening of bids and to coordinate with the bidder. In the demonstration, among other aspects, all the functionalities presented by the platform and the user experience in Ceibal devices will be evaluated.

7.3. EVALUATION CRITERIA

Without prejudice to what is established in the General Terms and Conditions regarding the evaluation of the offers, these will be evaluated taking into account the fulfillment of the mandatory and desirable requirements.

A technical-economic evaluation of the submitted proposals will be carried out, where the technical requirements (mandatory and desirable) will have a weighting of 70% and the economic offer of 30%. The final score of each offer, considering both the Technical Evaluation and the Economic Evaluation (Licenses and Implementation Cost), will be given by the following formula: (POME / PO) * 30 + (PTO / PTOMC) * 70. In this scheme evaluation “POME” is the price of the cheapest offer, “PO” is the price of the offer being evaluated, “PTO” is the technical score of the offer being evaluated and “PTOMC” is the technical score of the best rated offer.

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The technical evaluation will have a total of 100 points (80 points for the mandatory requirements and 20 for the desirable requirements).

8. OFFER

8.1. ITEMS TO BE QUOTED

8.1.1. Licenses

Ceibal's objective is that the products and services it provides are used by all beneficiaries (students, teachers, etc.). Therefore, all Ceibal users will be loaded into the system, regardless of their use of the platform.

However, Ceibal will only count ACTIVE LICENSES, which are licenses associated with users who exceed a certain level of use. An active license is considered to be a user who enters and records activity on the platform for at least 10 days during a calendar year. The mode of payment is an annual flat fee for each of the bands and not the individual license. The supplier must quote all the bands.

The minimum time horizon that Ceibal is able to guarantee for a contract is 3 years, provided that the project is successful in its first year of implementation.

The bidder must quote in SaaS (Software as a Service) mode, which implies that the cost must include, in addition to the license of use, hosting and backup, update, maintenance and support services. If the bidder handles several levels of support, any level of service not included in the value of the licenses must be detailed, described and priced separately.

Active license bands will be priced according to the following volume bands:

Up to 10.000	**More than 10.000, up to 25.000**	**More than 25.000, up to 50.000.**	**More than 50.000 up to 100.00**	**More than 100.000**

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A price for each of the active license bands must be quoted. The teacher, guest teacher, administrator or parent profile licenses must be provided free of charge and will not be counted in the active user bands.

The provider must quote each of the bands in its entirety, the first band of users ensures the minimum income of the provider regardless of the number of licenses consumed. As an example, if the provider quotes USD 30,000 for the first strip and USD 45,000 for the second and at the end of the year 5,000 licenses are consumed the amount to pay is USD 30,000, on the other hand if 11,000 licenses are consumed the amount to pay is USD 45,000.

The bands refer to the total number of active users accumulated during a year (January-December).

8.1.2. Implementation Cost

The provider must indicate if there is a deployment cost, or parameterization as part of the one-time implementation process in the first year. The cost of implementation must include authentication (REQ. 4.1.1), user provisioning (REQ. 4.1.2) of users and automated export of usage data (REQ. 4.1.7)

8.1.3. Development Hours (mandatory)

The item hour of web development and development / adaptation of didactic contents must be quoted, which may be requested in case Centro Ceibal requires adjustments for adaptation and integration with external services or customization of the Platform.

8.2. PRESENTATION

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The bidder must present his offer segmented in folders, according to the following guidelines:

1. Folder with complete Annex I: COMPLIANCE TABLE, y Annex II: PRICE QUOTE.
2. Folder with functional description and technical specifications of the platform. (It must include the detail of the Functioning Conditions), the documentation corresponding to the non-functional requirements (including the SLA and compliance table referred to Information Security, Confidentiality and Data Protection ANNEX IV: SECURITY, CONFIDENTIALITY AND DATA PROTECTION).
3. Folder with project plan as specified in section IMPLEMENTATION PROJECT
4. Folder with complementary technical information that the bidder considers pertinent to provide.
5. Folder with a description of the bidder's background.

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ANNEX I: COMPLIANCE TABLE

The bidder must complete the compliance table for all requested requirements. For the evaluation team's reference, it must also indicate in which part of the submitted offer the information corresponding to the requirement is.

The **COMPLIANCE** column will be completed with the options Yes / No / Partial. In the event that compliance is partial or requires development, it should be indicated and briefly described in the **OBSERVATIONS** column.

FUNCTIONAL REQUIREMENTS - MANDATORY				
SECTION		CATEGORY	COMPLIANCE	OBSERVATIONS
3.1.1		**Usability**		
3.1.2	**3.1.2.1**	**Contents/Levels and Themes**		
	3.1.2.2	**Contents/Variety of formats and modalities**		
	3.1.2.3	**Contents/Order and sequencing**		
	3.1.2.4	**Contents/Adaptation to the target audience and thematic adaptation**		
3.1.3		**Autonomous student use**		

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3.1.4	**Possibility of producing student texts**		
3.1.5	**Monitoring and personalized feedback on student progress**		
3.1.6	**Personal monitoring and student activity**		
3.1.7	**Users and profiles**		
3.1.8	**Language**		

FUNCTIONAL REQUIREMENTS - DESIRABLE				
SECTION		CATEGORY	COMPLIANCE	OBSERVATIONS
3.2.1	**3.2.1.1**	**Contents/Other levels**		
	3.2.1.2	**Contents/Curricular Mapping**		
	3.2.1.3	**Contents / Adaptability**		
	3.2.1.4	**Contents / Accessibility**		
3.2.2		**Teacher materials and lesson plans**		
3.2.3		**Content distribution**		
3.2.4		**Connection with *Biblioteca País***		

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3.2.5	**Offline content for web & app solution**		
3.2.6	**Other users and profiles / Parents and Guardians**		
NON-FUNCTIONAL REQUIREMENTS - MANDATORY			
SECTION	CATEGORY	COMPLIANCE	OBSERVATIONS
4.1.1	**Authentication**		
4.1.2	**User provisioning**		
4.1.3	**Web compatibility**		
4.1.4	**Web technology**		
4.1.5 **4.1.5.1**	**Compatibility with devices/General compatibility (laptops and Android tablets)**		
4.1.5 **4.1.5.2**	**Device Compatibility / General Compatibility (Laptops and Android Tablets)**		
4.1.6	**Functioning conditions**		
4.1.7	**Automated export of usage data**		
4.1.8	**SLA**		

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4.1.9	**Information security, confidentiality and data protection**		
NON-FUNCTIONAL REQUIREMENTS - DESIRABLE			
SECTION	CATEGORY	COMPLIANCE	OBSERVATIONS
4.2.1	**User provisioning**		
4.2.2 **4.2.2.1**	**Device Compatibility / General Compatibility (Cellphones and iOS)**		
4.2.2 **4.2.2.2**	**Compatibility with devices / Compatibility with devices delivered by Ceibal- other levels**		
4.2.3	**Hosting from fixed IP for data exoneration**		
4.2.4	**Availability of environment for testing**		

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ANNEX II: PRICE QUOTE

The quote must include:

- Flat fee

It must be quoted per year according to the following detail:

Range	2021	2022	2023
Up to 10.000 active users			
Between 10.001 and 25.000 active users			
Between 25.001 and 50.000 active users			
Between 50.001 and 100.000 active users			
More than 100.000 active users			

- Implementation cost
- Development hours: Quote the unit price of the development hour.

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ANNEX III: PROPOSED CONTENT OF DATA EXPORT

To comply with the requirement "Automated export of data" the proposal must include:

What data is exported?	How is the data exported?
● Conceptual explanation of the data to be exported that allows a primary understanding. It should show the concept of structured and unstructured data and where the document number, type and country will be handled (for example: Entity Relationship Model; Logical Model) ● Aggregation level (raw data without transformation or level at which it is transformed / aggregated) ● Data that is captured (both those entered by the user and those captured automatically) and that cannot be accessed, explaining the reason for non-access (if this were the case) ● Identification and explanation of priorities when not all data is available ● Documentation	● Functional and technical description of the solution. ● Export frequency (for example immediate, once a day) ● Access to historical data (access to data exported from previous days, months or years) ● Supported volumes ● Response time ● Documentation ● Direct or indirect costs (at this point, any unspecified cost will be considered by the supplier since it is not possible for Ceibal, in this instance, to evaluate the impact)

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ANNEX IV: SECURITY, CONFIDENTIALITY AND DATA PROTECTION

List of requirements

Design and Architecture

The solution should have security built into its design by using best practices and incorporating security from design as part of the entire process of the development cycle solution.

You must meet the following requirements:

- Layered development (presentation, business logic and data).
- Modular solution with separation and grouping of functionalities by categories or modules that allows the scalability of the solution and facilitates integration and compatibility with other solutions.
- Reliable architecture that incorporates a comprehensive security vision covering the aspects of confidentiality, availability, integrity, non-repudiation and privacy through metrics and qualitative and quantitative indicators.

Authentication

The solution must comply with secure authentication methods that allow verifying the identity of the users and protect the confidentiality of the information.

It must incorporate the following requirements:

- Authentication with username and password that complies with the password policies of Centro Ceibal.

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- Compatibility with the centralized authentication system (SSO) used by Centro Ceibal. Corresponds to the requirement Authentication

Session management

The solution must provide adequate user session management allowing to know the current status of the user or the connected device.

For this it must:

- Maintain unique sessions for each user that cannot be guessed or shared.
- Sessions will be disconnected when they are no longer needed or during a period of inactivity (as parameterized as possible).

Access control

The solution must provide adequate access control management in order to authorize access to functionalities and data in accordance with the profiles and roles that are defined.

For this it must comply with:

- Users who want to access certain resources have the correct credentials.
- Users are associated with an adequate set of roles and privileges according to the functionalities provided by the solution and the accessible resources.
- The metadata of the roles and permissions must be protected from manipulation and reuse.
- Assigning access control follows the principle of least privilege.

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Coding and validation

The most common weaknesses in modern web applications are the failures to correctly validate the data inputs that come from the users and the environment, prior to the use of this information. These weaknesses generate most of the known vulnerabilities and attacks such as Cross-Site Scripting (XSS), SQL Injection, file system attacks, Unicode attacks and buffer overflows.

The solution must comply with:

- Ensure the validation of inputs and outputs through a coding architecture and secure information flows that prevent injection.
- The input data is robustly entered and validated or in the worst case filtered and refined.
- Ensure robust output encoding that takes into account the context of the information and is as close to the external interpreter as possible.

Error handling and log verification

The solution must generate quality information in the logs and properly manage error messages, avoiding the publication of sensitive information as much as possible.

To achieve this the solution must:

- Not collect sensitive information in logs unless it is necessary or specifically required.
- Ensure that the information contained in the logs is managed according to its classification level (for example, taking into account the life cycle of the information and its expiration).
- Include useful information for auditing and troubleshooting, including at least

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date, time and details of events, changes in the configuration, attempts to access the system (successful and rejected).

Confidentiality and Data Protection

The solution must ensure the confidentiality, integrity and availability of the information and personal data. To implement adequate data protection, the solution must ensure: legality, veracity, purpose, prior informed consent, data security, reservation, and responsibility. For this the solution must:

- Comply with current Uruguayan regulations on personal data (Law No. 18,331, of August 11, 2008 and Decree No. 414/2009, of August 31, 2009). Information of any kind referring to specific or determinable natural or legal persons is considered personal data, by way of example, any numerical, alphabetical, graphic, photographic, voice and image, acoustic or any other type of information that refers directly to them or indirectly, in accordance with the provisions of Article 4 of Law No. 18,331 and Articles 1 and 4 of Decree No. 414/009.
- Adopt the necessary security measures to guarantee the security and confidentiality of the data and prevent its adulteration, loss, consultation or unauthorized treatment, as well as detecting deviations of information.
- Protect information and data created, edited, deleted or accessed without the corresponding authorizations, in particular in massive amounts of data.
- Take the necessary precautions and controls so that personal information and data are not available in browsers, load balancers, temporary copies, cookies and other structures where it is not necessary.
- Ensure the confidentiality of all information that is processed or used. Confidential Information includes, among others, by way of example, the following information: all commercial strategy, plan and procedure, proprietary

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information, software, tool, process, images, personal data, methodology, information and trade secret, and other information and Ceibal material, as well as students, beneficiaries, teachers, study centers, which could be obtained from any source or could be developed. .

- Host the data in Uruguayan territory, or in the case of international transfer, ensure that the server is in countries considered with adequate levels in accordance with Directive 95/46 / CE. Otherwise, it must have the consent of the owner of the data for the transfer to an inappropriate territory, or that the importer has signed standard contractual clauses with the exporter or has a registered Code of Conduct, with the consequent authorization of international data transfer processed before the Regulatory and Control Unit of Personal Data, in the last two cases.
- Not use the information / data for a purpose other than the one contracted, nor for their own benefit, be it free or onerous, nor assign, communicate or transfer them to third parties.
- Centro Ceibal will be responsible for the database and the treatment, with the awarded Company and its subcontracted companies being in charge of treatment, in accordance with the provisions of literals H) and K) of article 4 of Law No. 18,331 .
- Allow the publication of the privacy policies and terms and conditions of use of Centro Ceibal in development.
- Allow the right of access, rectification, updating, inclusion or deletion of personal data.
- Return or delete from all its physical and logical systems and files, whether owned or contracted to third parties, the personal data accessed, obtained or processed, as well as the associated metadata, at the request of Ceibal.

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Communications

The solution must provide a secure communication of the managed information in order to ensure its confidentiality.

For this it must:

- Publish services through secure protocols (TLS or strong encryption) for all users and regardless of the sensitivity of the information transmitted.
- Protocols and algorithms considered safe by the industry and good practices will be used, leaving as a last resort or for compatibility issues that are expressly authorized by Centro Ceibal the use of other less secure protocols.
- The solution must be entirely compatible with the certificates used by Centro Ceibal and in case of using internally generated certificates, they must be validated by the certification authorities that Centro Ceibal establishes.
- All communications outside the HTTP protocol, such as e.g. remote access, communication between layers of the solution, middleware, databases, external data sources, monitoring, communication tools, etc. must be secure communications and if possible encrypted.

Use of files and resources

The solution must provide controls over file management in order to guarantee information security.

For this it must comply with:

- Insecure files must be properly managed in order to guarantee the confidentiality, integrity and availability of the information.
- Controls must be implemented for uploading, executing, downloading and

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hosting files that shield the solution from malicious attacks and inappropriate configurations such as: zip bombs, incorrect file types, pass-traversal attack, hosting with permissions or in directories wrong, SSRF attack.

API and Web services

The solution that makes use of APIs (commonly through the use of JSON, XML, GraphQL or other formats) must comply with:

- Maintain adequate authentication, session management and authorizations for all web services.
- Input validation for all parameters that are entered.
- Effective security controls over all types of APIs, including cloud and without APIs server.

Backups and contingency

The solution must be compatible with an adequate data backup and recovery policy in order to ensure the integrity and availability of the information in the event of incidents.

The solution shall:

- Comply with a business continuity plan, which offers the necessary contingency to ensure the availability, integrity and confidentiality of the information in the face of different types of incidents.
- Provide the necessary technological solutions (e.g. backups and disaster recovery plan) in order to ensure the levels of availability and integrity stipulated in the service level agreement (SLA).

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Cryptography

The solution must meet the following cryptographic controls requirements:

- Allow the use of cryptographic modules to protect the solution's sensitive information such as financial information, personal data, and role and permission data, whether at rest, in use and in transit.
- Use robust encryption algorithms (such as AES and RSA) with keys of adequate length to protect against attacks.
- Generate suitable random numbers.
- The access to the encryption keys must be managed securely.

Malicious code

The solution must not contain malicious code of any kind. To comply with this, the solution must, among other characteristics:

- Use malicious code detection tools in the development process.
- Not include time bombs or other similar types of attack.
- Not transmit information or contact to malicious or unauthorized destinations.
- Not contain back doors, rootkits, "salami" attacks, Easter eggs and other types of malicious code or that do not follow good practices.
- Take the necessary measures so that the solution does not incorporate malicious code through controls such as code signing, use of secure libraries and frameworks, expiration control over DNS, etc.

Business logic

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The solution must provide a business layer developed in a secure way and that allows avoiding the most frequent cyber-attacks. For this it must comply that:

- The flow of business logic must be sequential, consistent and cannot be altered.
- The business logic includes controls and limits to detect and prevent automated attacks.
- The business logic must take into account use cases that include malicious actors, abuse cases and must also contain protections against spoofing, manipulation, repudiation, information disclosure and privilege elevation, among others.

Settings

The solution must comply with the requirements and configuration controls that guarantee a safe application.

It must include:

- An environment that is as secure, repetitive and automatable as possible through the incorporation of good practices (e.g. DevSecOps model) with tools, processes and technologies that * implement it properly (e.g. containers, automated deployments, etc.).
- Updated and properly maintained development tools and environments.
- Development tools and environments correctly configured and verified for their security (hardening) such as e.g. disable debug mode in production environments.

Default security in user settings and permissions.

Certifications

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Certifications and compliance with standards related to secure development, information security and privacy will be valued, such as:

- Common criteria certification (ISO IEC 15408)
- CPA Build Standard
- OWASP ASVS
- ISO 27001
- FIPS 140
- SCAMP
- CIS Benchmarks
- AICPA SOC2-3
- NIST CSF / 800
- ISACA Cobit
- PCI DSS
- GDPR

Methodology

Proposals that incorporate software design and development methodologies with a comprehensive view of security in the development process will be valued.

Vulnerability scan

Solutions that have undergone standardized vulnerability checks and / or penetration tests will be valued. Proof of the same must be provided by means of a summary report or corresponding certificate.

Report detailing threat coverage on the latest OWASP Top Ten in force will be valued.

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Security compliance table

To be completed by Ceibal			To be completed by bidder	
No. Req.	**Requirement**	**Type**	**Compliance**	**Observations**
1	Design and Architecture	Desirable		
2	Authentication	Mandatory		
3	Session management	Desirable		
4	Access control	Desirable		
5	Coding and validation	Desirable		
6	Handling errors and logs	Desirable		
7	Confidentiality and data protection	Mandatory		
8	Communications	Desirable		
9	Use of files and resources	Desirable		
10	API and Web Services			
11	Backups and contingency	Desirable		
12	Cryptography	Desirable		
13	Malicious code	Desirable		
14	Business logics	Desirable		

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15	Settings	Desirable		
16	Certifications	Desirable		
17	Methodologies	Desirable		
18	Vulnerability scan	Desirable		

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