# InterPARES 3 Project

International Research on Permanent Authentic Records in Electronic Systems

## Title: The authenticity of Data-Centric Systems at the Girona City Council


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**Project Unit:** Case Study

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# Case Study Report

## A. Overview

The main objective of this project is to identify the rules that maintain the integrity, reliability and authenticity of data-centric systems in a record's active phase.

It is more difficult to maintain and demonstrate the authenticity of a data-centric system than the authenticity of a docucentric system, because there is a critical period of time between ingest and fixation of data. Hence, it is necessary to define how to maintain the safety of data.

The purpose of our case study is to identify solutions to ensure the safety of data-centric systems. That means securing databases that contain electronic records during the period between their creation and their fixation in a docucentric system or in preservation copies. The case study is mainly focused on the management of the Municipal Register of Inhabitants, but it aims to be able to compare the results with other registers maintained in databases. At the end of this case study we aim to obtain a model or different reference models, implementation strategies on specific cases and frameworks of a particular area as well as an evaluation and spread of our experience.

In a local public administration there are many databases created by different departments that produce electronic records. This is the reason why we could apply our test-bed outcomes in several specific cases.

The City Council of Girona is the test-bed for this case study. The city of Girona, in Catalonia (Spain), is located between Barcelona and the French border.

## B. Statement of Methodology

The methodology for this case study is based on the analysis of the sector-based legislation in the fields under study, particularly in reference to the statistical role of the administration, which is the most precise and detailed area of legislation. Once the function and the activities arising from this were identified, the next step was the analysis of the documentation produced.

These first studies produced sufficient information to enable us to obtain an overview of the content, context and structure of the records. It should be noted that in the case of the Municipal Register of Inhabitants, the documentation that existed in the Municipal Archives

that was produced before the implementation of the continuous computerized records, from 1996, was also analyzed.

The information obtained was then used as the basis for interviews with the heads of the different creator units to identify the process for managing their actions and the way this gives rise to the relevant records. The information obtained has been compared with the data recorded in the system, who is responsible for adding data, at what point, who has access to the data and for what purposes.

In parallel to this, interviews were also carried out with technical staff of the Systems and IT Service, more specifically with those responsible for the development and maintenance of information systems in place to support the management of the Municipal Register of Inhabitants, the accounting registers and the register of economic activities, entertainment and public health. Interviews and meetings were also held with the technician responsible for the implementation of the electronic signature and electronic processing to assess the possible effects on the management of the records and any potential interconnections.

Finally, the case study was presented within the framework of TEAM Catalonia and also at other professional events, where it was subject to debates that were always positive in their outcome.

# C. Description of Context

### Provenancial context:

The Girona City Council was created in 1284 by royal concession and it is the lower level of public administration, so the nearest to citizens. The documentary holdings are kept at the Girona Municipal Archives (abbreviated AMGi in Catalan) and date back to the 12th century, with documentary series that have maintained their continuity from the beginning of the 14th century to the present.

The Government of the City Council is administrated by the Mayor and the Councillors, in accordance with the elections results. Each councilor manages an area of services in accordance with the responsibilities assigned by the Mayor and the budget approved by the City Council. Nowadays (2012), the budget of Girona City Council is around 100.000.000 € and there are employed about 1.000 full-time staff. Girona City Council is financed by citizens' taxes and governmental transferences and grants.

The mission of Girona City Council is defined by basic municipal legislation in regard to the administration of the territory, the provision of public services to the people living in the city and fostering the economic and social development of the area.

According to the legal framework, the main areas of management are the government of the region and the institution itself, general and financial administration, planning and control of the territory, the provision of public services and personal services, socioeconomic development and inter administrative cooperation.

The main areas of management are:

1. The government of the region and the institution itself.
2. General and financial administration.
3. Planning and control of the territory.
4. The provision of public services and personal services.
5. Socioeconomic development.
6. Inter administrative cooperation.

Within these areas of management and in line with legislation, the functions of the City Council are based on the exercise of the following powers:

1. Rule-making and self-organization powers.
2. Tax-raising and financial powers.
3. Programming and planning powers.
4. Expropriation powers.
5. Investigation and demarcation powers and ex officio recovery of its rightful property.
6. Compulsory and disciplinary enforcement powers.
7. The power to carry out the internal review of its agreements.
8. The power to grant and control permits and licences.

These activities give rise mainly to the following records:

1. Citizen applications.
2. Technical reports.
3. Motions for resolution.
4. Register of government resolutions.
5. Notifications.
6. Requirements.
7. Communiqués.

## Juridical-administrative context:

Girona City Council is a public administration according, initially, the law L7/1985 about Local Public Administration, developed later in other specifics regulations for Catalonia, mainly L8/1987 and DL2/2003.

Also, Girona City Council is committed to full compliance, among others, with both Spanish and Catalan law on the legal system and general administrative procedures, the protection of personal data, electronic media within the public administration and electronic access of citizens to public services.

It doesn't exist non-legally norms or standards about methodologies, codes or regulations to manage City Council. However, in the specific domain of Records Management, City Council has policies and procedures that are under control of the Records Management, Archives and Publications Service (abbreviated SGDAP in Catalan). For example:

- Regulation governing the Municipal Archives of Girona (AMGi)[1].
- Regulations governing the management of electronic records of Girona City Council[2].
- Ordinance regulating e-administration in Girona City Council[3].
- Circular of transfers.
- The SGDAP Strategic Plans for 2008-2011 and 2012-2015.

SGDAP has competences on the Records Management System, so on the digital records too, and has developed a corporative Records Management System aligned with the principles of the main standards and best practices like ISO 15489:2001 - Information and documentation - Records management, and also with ISAD(G), among others.

SGDAP is directly politically dependent on the Mayor's Office for carrying out its mission. It has 15 permanent members of staff and three external consultants that work with the service on a regular basis (see appendix 1). The department's budget for 2012 is €918,400, including staffing costs.

Responsibilities for documentation varies depending on the point in the life cycle of the document. From the moment of creation until its prescription (a period of approximately five years) the creator unit is responsible for the record. After this period, the physical and custodial transfer of the record to the Administrative Archives takes place. If the offices in question do not have the space to wait for five years before the record is transferred to the Administrative Archives, the Central Management Archives is used. This space is shared throughout the organization for documentation that is not required to be kept confidential. The space is managed by the Administrative Archives, but the creator unit remains responsible for the documentation.

This system is the same for electronic records with the exception of the physical transfer, which does not exist. This means that the creator unit is responsible in the first instance for the creation and storage of electronic records. When the time comes for this documentation to be transferred to the Administrative Archives, all that takes place is the custodial transfer, without the physical transfer.

In general terms, SGDAP is responsible for the organization and maintenance of the records management system and for the support application, but the creator unit remains responsible for the records until these are prescribed or transferred. From that moment, the specific records also become the responsibility of SGDAP.

[1] Available at https://seu.girona.cat/export/sites/default/dades/ordenances/_descarrega/reglament_arxiu_municipal.pdf (2012-03-30)
[2] Available at https://seu.girona.cat/export/sites/default/dades/ordenances/_descarrega/normativadocselectronicsSGDAP.pdf (2012-03-30)
[3] Available at https://seu.girona.cat/export/sites/default/dades/ordenances/_descarrega/ordenaca_adm_electronica.pdf (2012-03-30)

In more specific terms, and particularly in regard to electronic records, it has been necessary to define the specific archival and technological responsibilities. Broadly speaking, SGDAP is responsible for the following tasks:

- Ensuring the authenticity of electronic records throughout their life cycle. This implies the regulation of use of the electronic signature, the management of metadata during the production phase of electronic records and the definition of the procedures by which the records are created.
- The medium- and long-term preservation of the records. This includes the processes of records assessment and sorting, capture and preservation formats, the digitization of paper documentation whether to substitute the paper format or not, the regulation and control of file conversions, the management of metadata for the preservation of electronic records, the preservation of the electronic signature, and the policies governing the refreshing of physical records.
- The management of transfers to the digital archiving system. This involves the definition of the calendar of transfers, drawing up protocols, the definition of formats and of physical and system destinations, and the management of transfer and access requests from the creator units.

The lines of collaboration with the Systems and IT Service (abbreviated as SSTI in Catalan) are based on:

- Design tasks focusing on the use of the electronic signature, all of the generic metadata and the obtaining of these, the acceptance of capture formats and the type of citizen identification in electronic applications.
- The development and maintenance of electronic records management and preservation applications.
- The maintenance of the necessary technological infrastructure and of the servers and the management of the corporate storage space.

In regard to records maintenance strategies, records in paper medium are managed in the different administrative branches, in the Central Management Archives, in the Administrative Archives or, if they are subject to permanent conservation, in the Historic Archives of the City, depending on the stage in their life cycle.

All digital records are managed on the organization's servers, as off-line conservation has been ruled out. Records of legal value are stored in the electronic documents management system (EDMS) that serves as a base for the different computerized applications. There are plans for both the authorized disposals and the transfers to a secure digital archives to be carried out from this records management system. These processes are currently being integrated into the system.

In 2003, SGDAP launched a project for the management and preservation of digital records. This project defined the basic formats for preservation while also drawing up an application catalogue in order to detect potential obsolescence. The preservation formats, essentially PDF, and the maintenance of the catalogue serve to minimize these risks.

One of the other aims of this project was to identify the information systems that could contain records in the form of data. This means that over and above generating records, these would

be data-centric systems in themselves, or would be in a position to become data-centric in the future. In such cases the integration of these specific systems with the corporate records management system described above is highly complex. In this regard, it would be necessary to find plausible short- and long-term solutions to guarantee the preservation of the data. Thus, we have determined to preserve in a variety of formats those records that reside in databases, and must remain exploitable in a long term, taking into account their retention periods. This would apply to records that are clearly regulated by law, such as the Municipal Register of Inhabitants, the tax registers or accounting registers.

In regard to legal provisions governing records, Girona City Council has to have a records management system for all of the records it creates and receives in line with the provisions of Law 10/2001 of 13 July governing archives and documents in Catalonia. This law also makes it mandatory for the City Council to ensure the preservation of records subject to permanent conservation. On the other hand, Organic Law 15/1999 of 13 December on the protection of personal data makes it mandatory to eliminate data, and therefore indirectly records, once these are no longer functional. The regulated disposal of documentation must take place in line with the tables and procedures approved by the National Records Access, Appraisal and Selection Committee of Catalonia.

In regard to the use of information and communication technologies and to citizen relations, Spanish Law 11/2007 of 22 June on electronic access of citizens to public services regulates the rights and obligations of the public administration and citizens, who can contact the administration using the channel of communication of their choice.

## Procedural context:

The general context of administrative management centres on a corporate records management system. Some knowledge of this context is essential for sufficient understanding of the internal working dynamics. This means a brief description of the system is needed. The system is based on four sub-systems or related systems: the classification system, the documentation description or control system, the conservation system and the access system.

The systems for the classification and control of records are supported by a corporate application developed by the City Council itself. The systems of access and conservation are partially integrated into this application and are also complemented by other independent IT applications.

The central and most critical point of the system is the records description and control element, based on a general file register. This register is then linked to three further registers:

- The General Records Register, that is, the City Council's register of entry and exit of records.
- The General Resolutions Register, which incorporates all of the resolutions issued by the municipal organs of government (mayoral decrees, Board of Government agreements and Municipal Council agreements).
- The General Reports Register, which is instrumental in enabling the automation of the production of records in the management of motions for resolution.

When registering a file, its classification must be established because this is the essential link enabling us to decide on the system of conservation and access of the record. The mandatory registration of files is reinforced by the fact that an exit record from the General Records Register cannot be registered if it does not include the number of the file to which it belongs. This obligation is also applicable to every motion for resolution from the organs of government of the City Council, which means that no motion can be resolved that does not belong to a registered file. These requirements mean that the system is closed.

Despite this, a documentation control system cannot be simply a collection of registers in which the staff must enter information. For this reason, we have been convinced from the start that it was also essential to offer solutions to facilitate administrative tasks. The strategy for this is focused on the comparative analysis of the structure of basic documents from any process: reports, motions for resolution, the resolutions of any organ of government and the external and internal notifications of these resolutions.

The result of this comparative analysis enabled us to establish the overlap between the common parts of the records and whether these can vary or not depending on the stage of processing. This has meant that both the General Reports Register and the General Resolutions Register are not just simple registers, but at the same time serve as forms for the production of records. This means that the information from a report can be captured and reused to draw up a motion for resolution, which in turn can be used to draw up a definitive resolution and for the automatic production of the notifications that, moreover, are also automatically recorded in the exit register.

To summarize, this strategy has strengthened the records management system while also facilitating administrative tasks, and has also allowed us to construct a system of databases to enable consultation of every municipal government decision and the associated records, in addition to allowing the normalization of a large proportion of administrative records.

In parallel to this, the analysis made of certain processes for the complete automation of the workflows has had two consequences. The first is that thanks to the previously established models for records and to the analysis of the information structure of these, in some cases it has been possible to produce templates, which means that draft records are produced automatically and all that is required is to check and validate them. The second has been the need to identify the essential procedures attached to every file. The result has been a collection of processes that can be used freely by the user for procedures where the workflow is not fully automated (the majority, given that automation is a complex process). This enables staff to attach records (only in PDF format and occasionally JPG) that were not created within the RMS, which means that all files can exist as fully electronic versions.

In spite of this, the majority of documents produced by Girona City Council are still in paper medium, although a large proportion of them are available within the corporate system as reference material for information and consultation. The next step, therefore, was to contemplate the large-scale creation of electronic documents, understanding these to be documents that are appropriately validated by electronic signature, in this case the records[4]. One of the first considerations was whether the introduction of electronic records had to take place within a complete management process, for example for a file, or whether in contrast this could be established on a cross-unit basis throughout the organization using several processes.

[4] There is only one word in Catalan and in Spanish to refer to *document* and *record*. Although these concepts actually exist in both languages, they are included in the same word: *document - documento*.

We took the following factors into account for Girona City Council:

1. As a preventive measure, the transition of files in paper medium to exclusively electronic format applies to documentary series that have been previously assessed and, where possible, with final disposal that anticipates their elimination.
2. The production of electronic records across the organization currently focuses only on normalized records, the content of which is also contained in other records. For example, since 2009 the large-scale use of the electronic signature has been applied to all of the notifications of resolutions, which are only conserved in electronic format. Despite this, citizens receive a printed copy with an identification code that enables them to verify it on the municipal website. A new scheme is about to be launched of electronic notifications via the inter-institutional technology platform.
3. The digitization of files or records in paper medium to replace the physical format can only be carried out subject to the specific regulation for the production of authentic copies that are duly approved and bear an electronic signature. This digitization is only carried out for series that are consulted extensively.
4. The production of electronic records always requires prior approval by the Records Management, Archives and Publications Service (SGDAP) and the Systems and IT Service (SSTI).

To summarize, we can say that the first steps in the production of electronic records were based on minimizing the risk of losses and the lack of reliability of the records for the institution when faced with the pressure exerted by the large-scale, indiscriminate use of the electronic signature. It should be noted that in regard to the electronic signature, there is continuing debate in Spain as to whether it is necessary to sign electronic records again before the time frame stated in the certificates that were generated. In this regard, the option chosen by Girona City Council was to trust the chain of custody and the importance of the context of production of the record. Our proposal includes the automatic checking of the validity of the record with the certification agencies when it is captured in the system. The verification label obtained will be integrated into the processing of the file as an extra procedure, together with the record's hash, which means its integrity can be checked at any time.

However, this system excludes all those records created and stored in data-centric systems, which are the subject of this case study and which mainly affect the Municipal Register of Inhabitants, accounting and tax registers and other registers for the control of authorizations of premises and activities.

## Documentary context:

The fonds of Girona City Council dates back to the creation of the institution on 25 January 1284 with the concession of a royal privilege for the constitution of a council in the city with authority to administer affairs affecting the city.

The organization of the fonds responds to the eight principal functions carried out over time by the institution, three of which are inherent to every organization (management, administration and economic resources) and which we can identify as basic in the municipal sphere:

1. Political organization and authority.
2. General administration.
3. Economic management.

The other five areas are specific to a city council, which means they are what differentiates a city council from any other type of organization:

1. Territorial planning and management.
2. Provision of public services.
3. Provision of services to individuals.
4. Economic and social development of the territory.
5. Services to other institutions or cooperation with other administrations.

The fonds reflects the changes in the municipal organization model: the mediaeval city council from its creation until its abolition in 1717 following the defeat by Castile in the War of Succession; the Bourbon municipality introduced in 1717, which remained in place until the start of the liberal municipality in 1845 and lastly, the consolidation of the liberal municipality until the democratic city council established from 1978.

## Technological context:

On a general managerial level there is a corporate records management system in place, but networking in different management areas is the most common system. The technological infrastructure has been developed by the municipal IT services based on Oracle with the support of a EDMS (Firmadoc by Aytos). The City Council is currently in the middle of the transition phase to the large-scale production of digital records.

Given the centralized nature of the IT system for management of the administration and therefore also of records management, all new applications are developed on the same platform so that they can be connected.

This means that the records or forms that have previously been normalized will be used for those records that it has been decided must be entered into the system. These applications save the records in the EDMS (Firmadoc) that in turn will be integrated into the future secure digital archives.

The records may be created within the system or captured by the system. This last group may come from outside the institution (electronic record entry register) or may be generated by computerized applications and incorporated into the system by the organization's staff. The latter case also includes digitized records.

Digitization, which is subject to prior authorization by means of a specific procedure, is carried out using scanners and the digital objects are entered into the system linked to the relevant file, or into an entry that refers to a register. The file and format types are:

- Text: PDF and TXT.

- Image: JPG, PDF and TIFF.

The format restriction is applied at the two entry points to the system: in the electronic record entry register (external) and during incorporation into the system (internal).

These formats have been chosen to facilitate the conservation of electronic records, as these are formats with public specifications that are very widely used.

# D. Narrative answers to records case study.

1. **Which activities generate these digital records?**

   The registration of the people living in the city generates the Municipal Register of Inhabitants.

2. **For what purpose(s) are these digital records created?**

   The Municipal Register of Inhabitants is the administrative register listing all of the inhabitants of a municipality. The municipality itself is responsible for keeping and updating the register.

   The contents of the register provide proof of residence and usual domicile. In fact everyone living in Spain is required to register with the register in the municipality in which they are usually resident.

3. **What are the digital components of these digital records?**

   The potential users of this record are the inhabitants of the city, Girona City Council and other administrative and public bodies such as the courts or the National Institute of Statistics (INE), which is responsible for drawing up the electoral roll.

4. **What are the key formal elements, attributes, and behavior (if any) of these digital records?**

   The key element of this record is the person-address relationship at a specific point in time. It contains: first and surnames, sex, place and date of birth, school or academic certificate or degree, nationality, national tax ID number or equivalent, usual place of residence.

   The address also serves to identify cohabiting, whether with relations or for convenience purposes.

5. **What metadata is manually added to the records by their author and their creator? What metadata is automatically generated and attached to the record?**

   The prior identification of the user and password in the system means that the metadata relevant to the user making the record and the date on which this takes place are

automatically incorporated into the entry relevant to any activity arising from the register. The only information entered manually is the type of entry being made.

All of the content data are entered into the system by technical staff of the Statistical Unit or the Citizen Information Office.

The date of printing and the page number are automatically included in the extraction of data for the production of records in PDF format. Identification and context data are also included at the start of the record. Both the PDF file and the TXT file incorporate the digital signature of the person responsible for their validation. This validation takes place after they have been incorporated into the records management service. This means that all of the information associated with the context of production, the data and a brief description of the content are included.

6. **In what formats do the digital records exist (e.g., Word or Excel files, .TIFF images, .wav files, etc.)?**

   The digital records that are in the operational systems are stored in the format of the Oracle database management system. Records produced by the extraction of data for affixing are in TXT and PDF, based on a physical copy on microfilm.

7. **What are the digital components of these digital records?**

   The digital records that are stored in the operational systems do not incorporate any components; instead they are a collection of related data. The digital records formed by the extraction of data incorporate the file corresponding to the digital signature.

8. **How are these digital records identified (e.g., is there a [persistent] unique identifier)?**

   In the database of the Municipal Register of Inhabitants, each entry is in record format. These records have a unique entry identifier which is also exported during the systematic extraction of data.

   The files obtained in TXT and PDF format incorporate a unique identifier once they are entered into the records management system that is managed by the electronic document management system. In addition, the name of the file also has a unique reference, which means that it can also act as an identifier.

9. **What measures does the creator take to ensure the accuracy, reliability and authenticity of the digital records and their documentation?**

   The crucial measure is the control of access and the management of permission for the maintenance of these. The only body authorized to carry out the maintenance of the register is the Statistics Office responsible for the register in question. Every maintenance operation (addition, removal or modification) is registered.

   The systematic extraction of data for affixing the register comes under the direct remit of SGDAP, which is working on its integration with the records management system and on putting it at the disposal of the Secretariat General for its validation.

Once these files are integrated into the system, access to them is limited solely to SGDAP staff.

**10. Once a digital record is created, how is it handled? That is, where is the record stored (e.g., the creator's desktop, sent to an information system, printed, etc.)?**

Once validated, the data entered into the system remain operative in the database. The resulting document is the registration sheet in the Municipal Register of Inhabitants (addition or modification), of which two copies are printed and signed by the parties involved, the City Council and the private individual. Of these two copies, one remains in the possession of the individual and the other remains in the office for the production of a paper register as well as the electronic one. The annual book of movements of the register is the result of the compilation of these registration sheets, which can be disposed of after 100 years, as established by law. When the register is closed, on 31 December, the PDF and TXT format copies are extracted from it.

**11. How are changes to these digital records made and recorded?**

Changes may be internal (INE) or as a result of an external application (citizens), with a record of this being kept in a new register of variation. This means that every change generates a history of movements, which means that the collected information for one person or one address is available in different entries.

**12. Are these digital records linked by an archival bond to records on other media? If yes, what records? How is their relationships made explicit?**

The registration sheets in the register correspond to additions, removals, changes of residence within the same city and changes to personal details. All of these registration sheets together give rise to the books of modifications relating to the municipal register and that must be stored for 100 years.

The Municipal Register of Inhabitants is the status of the number of inhabitants with their details (names, addresses, Spanish national ID numbers etc.) at a specific point in time. Both the register and its variations affixed in the registration sheet have a unique identifier. This identifier is also noted in the data extraction carried out and in the security microfilm.

**13. If the archives have the records in custody, when and how were they acquired? How were they processed? How are they preserved?**

The last Municipal Register of Inhabitants in paper medium dates from the year 1996, after which the register became a continuous register. At present, the only items included in paper medium are the books compiled from the collection of registration sheets. These are included five years after their closure and correspond to changes made to the register (additions, removals, changes of residence, personal details).

The systematic extraction of data to affix the register in the database is carried out directly by SGDAP as used to be the case with the paper format: the complete register every five years, and its rectifications each year. Once the data have been extracted and the title page with the context information has been added, the records are integrated

into the records management system and into the digital repository for their validation by the Secretariat General.

There is a plan in the short term to design a simple database for files in TXT format so that these can be exploited following their dissociation from the data, for statistical and consultation purposes.

As these are the normalized format of PDF files, the necessary conversions will be made as required. However, a policy must still be drawn up on how to validate the new versions of records. There are no plans in the short term for conversions of the files in TXT format.

14. **If the archives do not have the records in custody, when does it expect to receive them?**

The records extracted from the database are already in the custody of SGDAP. However, it is true that they are not yet in a secure digital archives; instead they are stored in the repository of the records management system. Nevertheless, the medium-term plan is for them to be integrated into the iARXIU platform, promoted by the Catalan Certification Agency of the Government of Catalonia and developed according to the OAIS model.

# E. Narrative answers to the project's applicable researchers questions.

1. **Which are the regulatory, auditing and policy making bodies that need to be sensitized to the importance of digital preservation, and what are the best ways of influencing them?**

Existing regulations or potential new regulations governing relations with third parties are particularly critical, given that often the need to establish the necessary requirements to guarantee both legal validity and medium-term preservation is often ignored. In this regard, the key aspect in any strategy that aims to influence these bodies is to question the procedures established based on the possible lack of legal security of the actions to be carried out, particularly when the aim is to attain greater simplicity in administrative or bureaucratic processes.

In contrast to this, preservation is usually simply a factor to take into account in regard to the risk it might imply for the institution.

In terms of policy, it is essential that the capacity for influence is based on the provision of solutions that are simple, concrete and feasible if these are to be considered. Simplicity is a fundamental criterion.

In the same way the capacity to influence auditing systems involves being able to provide clear and precise tools and indicators that respond to criteria of simplicity and the specific focus on identifying the problems detected. In this regard it is essential that the detection of dysfunctions be dealt with in precise, practical corrective instruments in order to be able to resolve the errors detected.

2. **How can we adapt the existing knowledge about digital records preservation to the needs and circumstances of small and medium sized archival organizations or programs?**

   Similarly to the section above, simplicity is essential both in the message and in the recommendations and, above all, in the guides to implementing specific, practical solutions. By this we mean that grand theoretical reflections are not very helpful.

3. **How and when should these archives or programs prepare themselves for digital preservation?**

   It is inevitable that any action will be carried out at the start of the life cycle of the records in question. It is therefore very helpful to take advantage of any modernization projects, technological changes or reorganization of working processes within the organization.

4. **What differentiates the preservation of digital records from that of any other digital entity for which the archives might be responsible?**

   We must guarantee the integrity, the reliability, the authenticity and the usability of records. From our perspective, a digital item that is the responsibility of an archive would not be in record format only if the item consists of copies for use or consultation. In all other cases the item should be considered to be in record format.

5. **What kinds of digital records, either soon to be preserved by a small or medium sized archival organization or program or already in its custody, are currently most in need of attention, and what are the most urgent issues and problems associated with their creation, management and/or preservation?**

   Without doubt those that are managed in and reside in databases, given that there is often no perception that they are really records, such as those arising from on-line forms. In addition, applications can often only increase the volume of information by getting rid of security copies, which leads to a high risk of obsolescence and loss in the short term.

6. **What are the nature and the characteristics of the relationship that each of these archives or programs should establish with the creators of the records for which it is responsible?**

   The relationship must be one of full involvement in the production of the records, but not only in terms of preservation guidelines; it must have an active role in the adoption or improvement of new ways of working, providing solutions for the everyday operations of organizations on an administrative level.

**7. What kind of policy, strategy and procedures should any such archives or program have in place to be able to control the digital records for which it will be or already is responsible from creation to preservation, and on what factors are these administrative devices dependent (e.g. a specific accountability framework and governance structure)?**

It is clear that the design and development of a records management system is fundamental. However, we must be aware that the archives service must also be the administrator responsible for key aspects such as the classification and elimination of records. It should be noted that this function often inevitably goes beyond the theoretical limits of archival science and has a direct effect on the working methodology and on problem solving in office environments.

In Catalonia, key factors have been the obligatory nature of recording all disposal of administrative documentation by the public administration in line with the tables approved by the National Document Access, Assessment and Selection Committee of Catalonia, of maintaining and conserving this register and the fact that the responsibility for this lies with archivists.

The assignment of the archiving service is also a determining factor. In this regard, its position within the field of culture makes no contribution to the ability to intervene at the start of the life cycle of records. In the case of Girona City Council, being directly dependent on the Mayor's Office has been one of the key factors.

**8. What action plans may be devised for the long-term preservation of these bodies of records?**

It is frankly difficult at present for small organizations to have access to records management support applications and even less to repositories with the function of a secure digital archives. There is no doubt that providing these organizations with these means would be an important step. In addition to this, the problem is also often the administration and maintenance of these systems if they are purely the responsibility of IT professionals.

**9. Can the action plan chosen for a given body of records be valid for another body of records of the same type, produced and preserved by the same kind of organization, person, or community in the same country?**

Very much so in organizations on the same level or of the same type. In the case of the public administration, the establishment of common guidelines and the reinforcing of both staff and infrastructure resources will be determining factors.

**10. Can the action plan chosen for a given body of records be valid for another body of records of the same type, produced and preserved by the same kind of organization, person or community in another country or culture?**

The same principles could be applied perfectly. The only difference would be the specific level of application of classifications, the legal framework, retention periods, etc. However, there is no reason that this should affect the principles.

**11. Can the action plan chosen for a certain type of record or system be valid independently of the creating or preserving organization and its context?**

It can be valid. However, it would be necessary to ensure that the legal criteria for its acceptance as valid legal documentation by the courts are appropriate. However, thinking in the long term, there is no reason why that should affect the field of research for cultural ends.

**12. What knowledge and skills are required for those who must devise policies, procedures and action plans for the preservation of digital records in small and medium sized archival organizations or programs?**

Knowledge of the foundations of the preservation of digital records is essential, although their added value would be their skill in managing the integration and improvement of the system in office environments. To achieve this, a good knowledge of the legal and administrative context of the organization is important, so that the person can foresee the ways in which changes to process management will affect records.

**13. How can records professionals keep their knowledge of digital preservation up-to-date in the face of ongoing and increasingly fast technological change?**

This is obviously a crucial point, but it is clear that it cannot depend solely on the individual efforts of the professional. The institutions responsible for records and archives management play a key role in this regard, alongside professional organizations in the field. To this end it could prove helpful to have observatories tracking trends in technology and management within organizations, so that these can provide information that can later be analyzed, debated and verified within professional communities.

In any case, academic studies and vocational training will be equally essential, but knowledge must be based more and more on the sharing of experiences. For this to be possible, it is essential to have tools of basic knowledge that, in as simple a way as possible, provide assessment guidelines and indicators that can be applied to different contexts.

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# G. Glossary

- **Exploitability of data:** The capacity of a collection of data extracted from an information system to conserve its informative value and also the possibilities of retaining its potential for exploitation outside of the system that created it. This capacity is linked to the description and documentation of the structure of data, the context of production and the content, and the maintenance of integrity, reliability, authenticity and usability requirements for the data.

- **Continuous register:** A record managed in a database formed by the sequential collection of entries that by their nature constitute a separate document each, so that in conjunction they constitute a compound documentary unit.

  A continuous register is characterized by the fact that it has no formal time limits and by the fact that each entry made is in itself the aim of the action giving rise to it.

  This means that the individual validation of the entry produces the effects resulting from the register function immediately, or launches the calculation of shortage anticipated by its legal regulation. This means that the entry itself contains the legal value of the action and by proxy takes on the value of the supporting documents provided.

  Examples:

  - Municipal Register of Inhabitants.
  - Register of Economic Activities, Entertainment and Public Health.
  - Register of Critical Infrastructures.

- Student Records Office.

- **Discontinuous register:** A record managed in a database formed by the sequential collection of entries, all of which, made during a pre-established, concrete period in time constitute a single documentary unit.

  The entries in a discontinuous register refer to other records in regard to administrative control, but they do not take on the value of these records. In discontinuous registers, the legal value is based on the grouping of the entries and the records supporting them, while the individual entries are only valuable in terms of administrative control of the final formalization of the register.

  Examples:

  - Accounting registers.
  - Student matriculation registers.

- **Data-centric model:** Information system in which the minimum unit of information is the data. Data have the same format and always depend on a database manager for their comprehension and exploitation.

- **Docucentric model:** Information system in which the minimum unit of information is the file, and each file can have a different format. The comprehension and exploitation of each file does not depend on a database manager.

# H. Diplomatic analysis of records.

### CONCLUSIONS

From the analyisis of the Municipal Register of Inhabitants we can conclude that, given the peculiarities and features of its management, its authenticity is acceptably high and satisfactory. However, we are aware that in all probability this is a very peculiar case. For this reason, we should enumerate as far as possible all the elements that make up or contribute to maintain its integrity, reliability, authenticity and usability throughout its life cycle. We believe that these elements may serve as references or indicators for establishing comparisons with other data-centric management models and, based on these comparisons, also to define a model of guidelines and recommendations on the preservation of records held in databases and on maintaining their authenticity over time.

Elements that strengthen integrity

1. The formal identification and definition of the register imply per se an initial measure of protection of its integrity. Consequently, not identifying and defining a register formally may actually imply the first and most important risk factor.
2. Thorough management to control users and their access and maintenance privileges ensures that the information is used and manipulated accordingly.
3. The maintenance of the information contained must always be based on the new data captured, which form a record of actions and movements, and not on their elimination.
4. The periodic and systematic extraction of data in multiple formats (PDF, TXT and microfilm).
5. The integration of files obtained into the corporate records management system.
6. Electronic signatures for files extracted from databases.
7. The evidence provided by the Certification Agency from the verification of the digital signature and the digital certificate.

Elements that strengthen reliability

8. Precise regulation of register management.
9. A clear definiton and delimitation of responsibilities for its management, as well as the appointment of an identified unit of the municipal organization chart.
10. Validation of the maintenance and mangement operations of the register through a basic digital signature (individual user and personal password), conserving the corresponding logs and assigning the date and time of validation.
11. Institutional regulation, within the current legal framework, of data extraction procedures, as well as their validation and management, taking into account the definition of what must be done, who should do it, when and how (WWWH) at all times.

Elements that strengthen authenticity

12. The complementarity of the integrity and reliability criteria applicable to the two data management stages: within and outside the database.
    - Within the database: points 1, 2 an 3 referring to integrity, and points 8, 9 and 10 referring to reliability.
    - Outside the database: points 4, 5, 6 and 7 referring to integrity, and point 11 reliability.
13. The no-alteration of data in the long term.

14. The identification and definition of records that serve as a database source and those originating from the database. This aids in strengthening the links between data and record, constituting the implicit traceability of actions.
15. Regulated periodic and systematic extraction in the short term.
16. The assignment of the responsibility for data extraction and later management to the Records Management, Archives and Publications Service (SGDAP), as a trusted service for long-term preservation.
17. The same continuity in time for the function carried out by the Municipal Register of Inhabitants, which consolidates the context.

Elements that strengthen usability

18. The nature of the continuous register, with intense and continued use, is such that it guarantees the transfer to updated exploitation formats.
19. The use of the appropriate formats for long-term preservation.
20. Guaranteeing the exploitability of data in different contexts is a priority.
21. The description and documentation of data structure, their presentation formats and the function of records generated in the system.

Different systems to validate or guarantee the information in entries have been asssessed and contrasted one by one: the electronic signature with certificate, the simple application of the hash function or the application of the hash chain funtion. However, these systems have been discarded due to the fact that they make managing each entry and the register as a whole more complex.

The possibility of designing a mirror-effect independent system for the selected data was also proposed. This system would have been managed by a trusted internal third party, such as the SGDAP. However, synchronized data extraction accompanied by a guarantee of the system's integrity complicate the system's operation more than they help it.

In evaluating and ruling out parallel or redundant maintenance or authenicity assurance systems, the possibility of applying them to oter registers was also examined, a fact which make them even more inviable. In any case, the periodic application of the hash chain function—for example, on a monthly basis—or the application of data integrity verification systems prior to periodic data extraction have been establshed as possible improvements.

# I. Findings and recommendations

For many years now the Girona City Council has had a reasonably effective records management system in place. Furthermore, for some time we have also been aware that certain actions taken exclusively in terms of databases have been left by the wayside. For this reason, we designed a procedure to preserve the information contained in some

databases when this information was in record format.

The established procedure for database preservation from the point of view of archival science, and not technology, involved the definition of formats, actions and procedure to be followed in order to carry out said preservation, as well as the institutional regulations necessary to ensure its legal validity. The criteria followed up until now focused mainly on the preservation and maintenance of the exploitability of data. This has been achieved through the periodic and systematic extraction of data in different formats: PDF, TXT and microfilm. However, certain aspects concerning the authenticity of data throughout their complete life cycle have not been taken into consideration.

This becomes particularly important if we consider the significance of the increase in the automation of workflows, based on workflow tools, which generate an enormous amount of data. Add to that the temptation of ceasing to print documents generated in the management of these processes, whether in paper medium or digitally in PDF format. Taken as a whole, it leads us to ask ourselves what is its real impact on records: What might the effect be on the authenticity of records? How can authenticity be maintained from the moment information is entered to its extraction during our preservation procedures? Can we assume that all these databases supporting the management of this process generate or could generate registers?

All this has led us to detect the need to identify and review all the existing registers in database management systems and, at the same time, reinforced our belief that we had to get to know the context of their creation much better. The opportunity to take part in the InterPARES project has allowed us to reflect on this dilemma.

Our **objective**, therefore, has been to identify the strategies with which to preserve the records managed in databases that also include the authenticity angle. Furthermore, our study has been made from a practical, and not theoretical, point of view, a reflection of the work we carry out for the Girona City Council, which greatly involves providing solutions to the day-to-day problems of the organization.

**Previous considerations**

When we speak of database preservation from the archival science point of view, what are we referring to? Not long ago, it was common to hear proposals such as, 'We'll transfer the entire database to you', whether speaking of an administrative or historical archives, or the discussion regarding whether the management of database processes should or should not give way to a 'new functional series', more generic, which would replace those preceding it, having become obsolete.

In light of proposals such as these it is inevitable that one ask the following: Do we want them to transfer the 'entire database' to us? Is it really possible? And if it's possible, is it viable? For what reason do we want the 'entire database'? First, one must question whether a database is transferable, because few and far between are the single and simple database tables and they are currently the exception to the rule.

In any case, we are quite convinced that we do not in the least want to talk about receiving a multitude of database transfers. Knowledge of the creation environments leads us to the conclusion that the only possible approach is one based on the simplicity of preservation strategies. This simplicity will inevitably result in data selection. However, in order to carry out data selection, we must first identify the functions that the database manages, which records it generated, and, finally, based on which data they were configured.

This brings us to the second 'proposal' mentioned on archival classification and databases: Are we looking at a new macro-functional series? From our point of view, we could answer a question with another question: Do we classify by functions or by the way in which they are managed? Without a doubt, archival classification is based on the need to identify functions, not on the new forms of managing them. Another difference is the existence of new management environments that could lead to a rethinking of the same function and, therefore, classification.

Furthermore, until now, the general and customary viewpoints held on how to address databases in relation to records were the following:

- The database is a single record.
- Databases generate records, whether in paper or digital medium. In this case, records are always located outside the database.
- Databases are storage containers for records.

The fist is a truly exceptional case and as such should be managed accordingly. However, we do not think that it involves a high level of complexity. The other two cases are common in organizations, and, in fact, can be encountered in tandem. In any case, and in light of that which has been stated, the most critical is the third case, the one on which we have focused. Its critical nature comes from the fact that these systems run a very high risk of being lost or their information modified, whether because they are registers constantly being updated or because, under the umbrella of 'information system', that which would equate to the attributes of the records, or their ability to serve as evidence or proof, has not been correctly identified.

Therefore, from the perspective of archival science, we believe it is necessary to consider the following fundamental objectives:

1. Archive information, above all that information contained in continuous registers, those constantly updated, and in particular that for permanent conservation. It goes without saying that in the case of continuous registers, not only must the integrity of data be monitored, but also the reliability of the actions taken involving said data.
2. Guarantee the authenticity of data in two different stages: from the moment it is captured to its periodic extraction and later placement in the register; and from its future retrieval from the register. Obviously, the main difficulty lies in the first of the two stages.
3. Maintain the exploitability of data, because it would make no sense, especially from the point of view of the organization, to preserve data but not the option of exploiting them. Therefore, we disregard any option directed at freezing data in these systems. However, maintaining the exploitability of these data does not mean that the application functions that created them need to be maintained, although they can always be documented in order to facilitate comprehension.

**Record identification**

The identification of these records is, in fact, the first key to preserving information management in databases. Therefore, products originating from database can be of two types:

- **Records generated** based on a combination of data and text templates that produce records printed on paper on in a digital file, generally in PDF format. In the case of

environments where printing is still done on paper, it is obvious that the advance to digital is probably imminent. However, it is equally certain that in both cases that the possibly of 'not printing' the document could be considered, in which case the risk of documentary amnesia skyrockets if correct measures are not taken.

- **Records contained** in linked data groups, created and maintained directly in databases. These sequentially accumulated data groups constitute, or could constitute, registers. From these data groups is born the need to identity the function or functions, the activities that generate them and the description of the context in which they are created.

The distinction between one and the other is derived from the management perspective of the organization. Therefore, while the first corresponds to a docucentric model, the second corresponds to a data-centric model.

The general characteristics of records generated in docucentric model are the following:

- The minimum unit of information is a file or digital object, not necessarily in the same format.
- Records are archived individually, whether as a single object or linked to more than one.
- Authenticity is based mainly on some type of digital signature.
- The management of digital objects is associated with a database, generally through an electronic document management system, but not integrated into the database.
- The structured exploitability of these records is not a required function, although the data used to created the records can form part of a formally defined register.

In contrast, the general characteristics of records contained in data-centric model are the following:

- The minimum information unit is the data, always in the same format.
- Data are not extracted from the system.
- Data are created and accumulated sequentially and can constitute registers.
- They can only be understood base on the links between data and previously defined presentation formats.
- Registers managed on databases can be formally defined and identified.
- Registers can be of two types, based on the nature of the entries they store:
    - Instruments that document actions and, therefore, the finality of the action in the validation of the entry stored, i.e. Municipal Register of Inhabitants.
    - Instruments that control other records, that is, that give a reference but do not substitute the value of the action they document, i.e. billing register.
- Registers can be continuous or discontinuous in time, based on whether the record constitutes the entry in the register (the action) or the accumulation of entries determined by a previously defined period of time, for example, a natural, fiscal or academic year.

The comparison between the characteristics of one and the other helps us to understand the importance of documenting the context in which records are created and even the identification of the record itself. We must be aware that, in registers which are not formally defined by law, regulations or internal instructions, it is highly probable that their implicit function within the management of the process not only becomes diluted—it is not even

identified. This is especially critical in continuous registers and, among them, in those whose objective is to document actions. We must also take into account another risk factor, which is that these registers often wind up sharing data with other registers. Therefore, identification cannot be limited merely to function, activity and the data supporting the record; its relation with other activities must also be identified so that we can guarantee its preservation in different creation contexts.

Furthermore, registers that are instruments that control other records constitute in and of themselves an indispensable tool for contextualizing other records. One must never forget that the resolution of any other procedure, apart from the records it generates, leaves behind the implicit traceability of a series of control instruments managed in databases. Therefore, the identification, knowledge and description of the relationships and links existing between records are essential in preserving electronic documents, and, consequently, this control instrument—for example, a register of record entry and removal—are yet one more part of ensuring trust in the system.

**Management authenticity**

When we speak of registers, if their data are never extracted from the systems, the treatment of authenticity involves the continuous management of the measures adopted to preserve online data. However, if we carry out data extractions from the system periodically, the treatment of authenticity clearly has two stages, although they are closely related. The first encompasses the moment information is entered to the time data is extracted; the second covers the time following extraction. Regardless, it must be noted that in continuous registers, such as local population registers, the regulated and validated extraction of data is not a substitute for maintaining authenticity in the creation environment, given the fact that the data must be constantly managed in a reliable way within the system.

In terms of the authenticity of the entries created in the register, we can assess options such as user management, the use of the digital signature or the application of various hash functions. Thorough management to control users, their access and maintenance privileges ensure pertinent use and manipulation of the information. However, whether or not the creation of data creation, validation and access logs is sufficient must be addressed, as well as the length of time that these logs should be kept. Data consultation access logs could most probably be eliminated in the short term (two years, according to the Catalan Data Protection Authority – APDCAT), but those dealing with creation and validation should maintained in connection with the register's record keeping period.

To guarantee the preservation of these data and other metadata associated with electronic document management, the possibility of creating a general metadata register must be investigated, which would be managed by a trusted third party (in our case, on an internal level this would be the Records Management, Archives and Publications Service (SGDAP)) and which would provide an independent and reliable mirror effect regarding said metadata. Suffice to say that this solution is excessively complex, due to the fact that distributed management of data makes their identification, mapping, security and extraction enormously difficult.

In relation to the use of the electronic signature, we must keep in mind that controlling access via the identification of the user and the personal password is a recognised form of signature by Spanish legislation, although it is considered to be the form that offers the lowest level of security due to its simplicity. In contrast, using more complex forms of certified signature in each of the entries of a register makes management more complex as well, because this requires the incorporation of a digital timestamp and the online receipt of proof of verification from the certification agency, and another one for the group of data, due to the difficulties surrounding the data migration process.

A simpler option than the use of digital signatures with certificate is the application of only the hash function as a control indicator for the integrity of an entry. However, its direct application in the entry is not valid as a general measure, as it is easily manipulated in systems without armoured user control. The option of applying a hash chain function in which each entry incorporates a hash code into both its own data and the previous entry offers a higher level of security, although data may still be manipulated if user management control is weak.

It is probable that none of the options described is valid on its own, but it could be of interest to explore the possible combinations according to the type of register being dealt with. In any case, the need to instil confidence in the system and the people that manage it is clear, while still implementing control measures that ensure integrity, reliability and authenticity. In the case of the Girona City Council, the optimum option is one of thorough user and permission management, the possibility of applying periodically a hash chain function for the whole file and, in addition, the periodic and systematic extraction of data for conservation in the middle and long term.

In defining and implementing preservation measures in the middle and long term, the Girona City Council has prioritized simplicity, security and the legality of the actions to be taken. Simplicity has been a determining factor in the archiving of information; in particular, for the identification and selection of data to be archived, the identification of the record and its structure, and the timeline of the register. Therefore, the identification and description that take place prior to the function, legal framework or even precedents in paper medium are indispensable, in light of the fact that, in the data environment, knowledge of the creation context is a determinant in a record's comprehension, exploitation and validity.

Along these lines, the existence of an application catalogue makes available accurate knowledge of the creation environments. The role of an application catalogue is to facilitate data identification, whether regarding content, the validation process or the links that allow the implicit traceability of the actions of the different management systems to be documented. It must also facilitate the discrimination of data and application functionalities intended only for the management of administrative activities. A good example of this would be complex task of tax register management and its resulting tax income management, which calls for the selection of data referring to tax registrations. Information for the calculation of taxes can be obtained based on the information included in tax regulations.

The security of authenticity management in the middle and long term focuses on the definition of the preservation formats considered, such as PDFs and TXTs. The purpose of the PDF option is founded in the record's presentation, whereas the TXT is destined to maintain the

exploitability of data. It goes without saying that in this case, the description of the structure of the file, the definition of fields and its context (which in this case acts as a link) are indispensable.

Furthermore, from the point of view of security, records considered as essential are also stored on microfilm, based on a COM (Computer Output to Microfilm) system, due to the long-lasting nature of the medium and the optimal print quality. Unlike vital records, necessary in re-establishing the day-to-day of an institution in case of emergency, essential records are those that are imperative to understanding the essential nature and function of the institution. An example would be the Municipal Register of Inhabitants or accounting registers, but not tax registers.

In terms of complying with the legality and validity of records obtained from a system for the selection and extraction of data, validation is obtained through the institutional regulation of the entire extraction process: what it aims to do, the exact content selected, and the function it represents; who is responsible for each action; and when and how it is to be done. That is, in accordance with the WWWH criteria mentioned earlier. This institutional regulation, a resolution of the local government, is carried out within the framework of legislation on matters of administrative procedure and therefore serves as instruments of law enforcement.

In addition, files are digitally signed by the Secretary General of the City Council with a digital certificate, from whom the corresponding proof of verification is also obtained. To ensure their management and preservation, files obtained are incorporated into the corporate records management system, while microfilms are described and incorporated into the description system of the Historical Archives. Gaps in the management process still remain, identified as points for improvement, and must be corrected. For example, manual intervention is still necessary to incorporate files obtained into the records management system, but planning is underway to make this process semiautomatic.

**Assessment and conclusions**

This type of intervention allows us to take corrective action in relation to some records stored in databases. For that reason, in 1997 the entire Municipal Register of Inhabitants became a continuous register. It goes without saying that this allows us to establish prevention measures, since these interventions have been incorporated into the system management routine on a yearly basis.

However, beyond these corrective and preventative interventions, their detailed analysis allows us to mould an intervention model that brings us closer to ‘predictive’ preservation. That is, in facing any process design or redesign initiative and the corresponding automation of workflows, through workflow tools, the prior identification of the data necessary to manage the process allows us to identify, if necessary, the possibility of setting up registers, formal and informal; however, we can, in any case, define by institutional regulation, assess and establish measures for future preservation. In certain specific cases, this has allowed us to

even create new records of a recapitulative nature from others on paper, which has facilitated their regulated substitution and elimination.

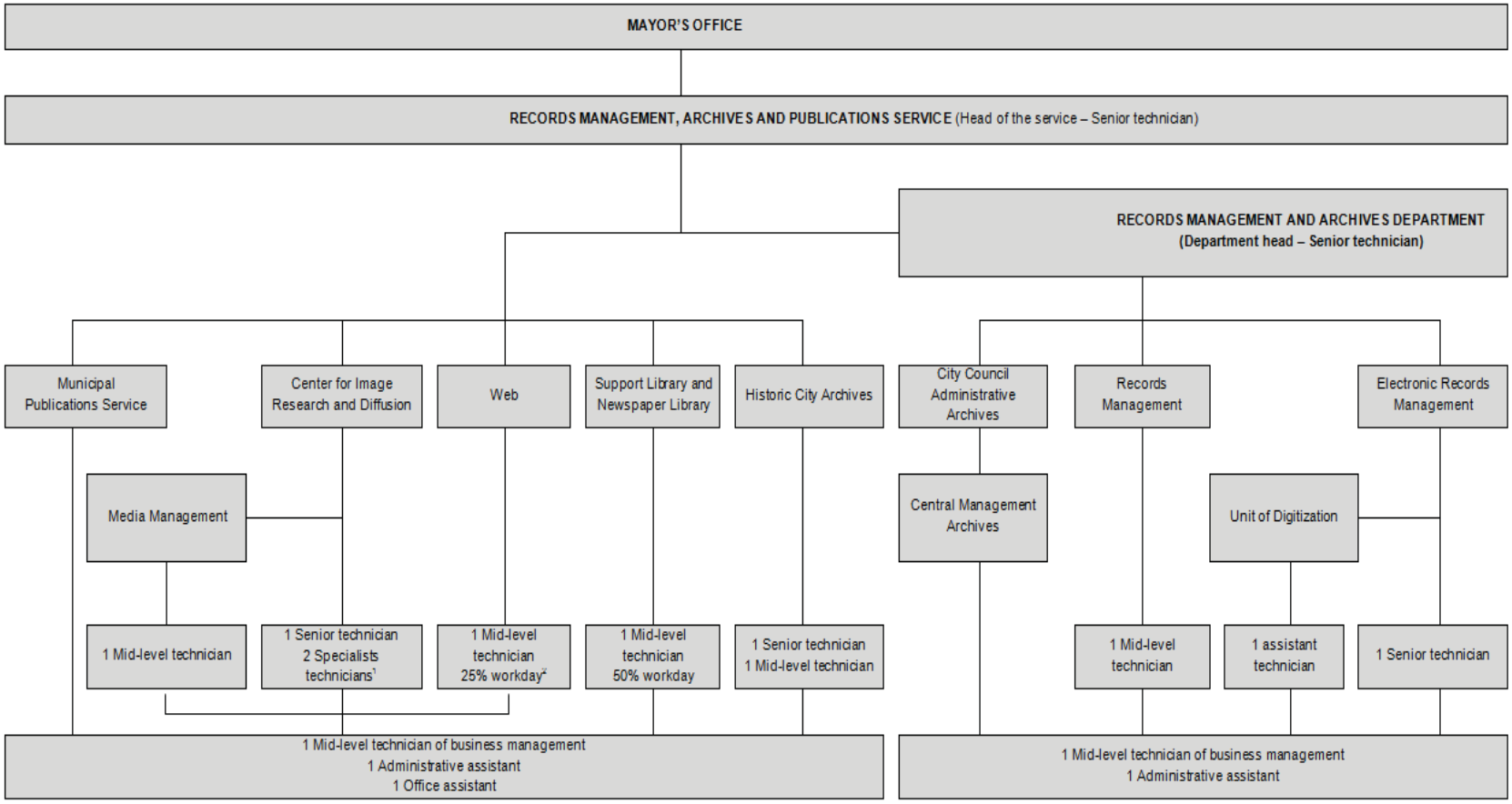
Therefore, in regard to the specific case of the Girona City Council, we can affirm that technological preservation measures have been taken. These have not been the only measures or the most determinant ones, but they have played a relevant role in terms of trust in the system and in the people that manage it, the definition and design of agreements for the preservation of records and their authenticity, and, finally, the institutional regulation of these preservation processes as a leading instrument. Definitively, we can affirm that the organizational measures have been equally or more important as the technological ones.

**General recommendations for preserving authenticity of Data-Centric Systems.**

1. The formal identification and definition of the register by legal framework or institucional regulation.
2. Thorough management to control users and their access and maintenance privileges for ensuring that the information is used and manipulated accordingly.
3. The maintenance of the information contained must always be based on the new data captured, which form a record of actions and movements linked to the original entry, and not based on their direct elimination.
4. The periodic fixation of information by the systematic extraction of data in multiple formats (PDF, TXT, XML and microfilm).
5. The integration of files obtained into the corporate records management system.
6. The use of digital signatures for files extracted from databases.
7. Verification the digital signature and digital certificate used and obtaining its evidence from the certification agency. This evidence should be integrated into the corporate records management system and linked to the record.
8. Precise regulation of register management.
9. A clear definiton and delimitation of responsibilities for its management, as well as the appointment of a identified unit of the organization chart to carry out said management.
10. Validation of the maintenance and mangement operations of the register through a digital signature, conserving the corresponding logs and assigning the date and time of validation taking into account their prescription periods.
11. Institutional regulation, within the current legal framework, of data extraction procedures, as well as their validation and management, taking into account the definition of what must be done, who should do it, when and how at all times (WWWH).
12. The identification and definition of records that serve as a database source and those originating from the database. This aids in strengthening the links between data and record, constituting the implicit traceability of actions.
13. Regulated periodic and systematic extraction in the short term.

14. The assignment of the responsibility for data extraction and later management to Archives Service, as a trusted service for long-term preservation.
15. The use of the appropriate formats for long-term preservation.
16. Guaranteeing the exploitability of data in different contexts is a priority.
17. The description and documentation of data structure, their presentation formats and the function of records generated in the system.

# Appendix 1 ORGANIZATION CHART




[1] Self-employed.
[2] Assumed by the Mid-level technician in media management.

# Appendix 2 DIPLOMATIC ANALYSIS

## CS02

## The authenticity of Data –Centric Systems at the Girona City Council Case Study

### INTRODUCTION

*Description of the case study in general.*

The objective of the case study is the analysis of databases containing records based on structured information in order to guarantee the authenticity and integrity of these. This means that we have not limited ourselves to a single record in the case study although we have focused mainly on the study of the Municipal Register of Inhabitants. In relation to this study, we have compared the characteristics of the municipal register with other records stored in databases such as:

- Register of economic activities, entertainment and public health.
- Accounting registers.
- Tax registers.

*Description of the technological environment in which the digital entity to be analyzed exist.*

The project analyzes an ORACLE database where the digital entity is born. Frequently from this database new digital entity are created, PDF, and it is saved in a docucentric electronic document management system (EDMS) called Firmadoc by Aytos company. These software are installed in hardware hosted in our CPD (data center). Both, software and hardware, are managed by the IT department of Girona City Council. However, the case study is mainly focalized on the management of Municipal Register of Inhabitants. In this case, data only reside into the system. The results of analysis can be compared in some cases with others registers maintained in databases.

*Identification and general description of the digital entity to be analyzed*

The documentation generated in the management of the Municipal Register of Inhabitants is part of the documentary fonds of Girona City Council and the activities resulting from its management come under the framework of the statistical role of the local administration.

The Municipal Register of Inhabitants is an administrative registry listing all of the inhabitants of a municipality. The municipality itself is responsible for keeping and updating the register. The contents of the register provide proof of residence and usual domicile. The procedure established in the 19$^{th}$ Century, and even more so the procedure established by the Municipal

Statute of 1924, was maintained with few variations until 1996, when the register became a continuous, computerized register.

The Municipal Register of Inhabitants is therefore an essential document, because it provides proof of a person's residence in the city, the specific place that they live, with whom and the level of relationship to these people, and since when. This information is essential for individuals as it enables them to enjoy or exercise their rights as an inhabitant of the city. It is also essential for city councils both in regard to the fulfilment of their duties to provide services and in regard to being able to require the obligations corresponding to them.

## IDENTIFICATION OF RECORD(S)

1. **TO BE IDENTIFIED AS A RECORD, THE DIGITAL ENTITY MUST POSSESS STABLE CONTENT AND FIXED FORM, AND BE AFFIXED TO A STABLE MEDIUM (OR PHYSICAL CARRIER).**

   - **The content of the Municipal Register of Inhabitants is stable or not and why**

     Yes, the content is stable, because once the data have been recorded the application does not permit their modification. This means that they cannot be overwritten or erased and that nothing can be added to them. Modifications must be submitted in the way required by legislation by means of removal, addition or change procedures to registration data. All of these modifications leave a history that is recorded in the system and is subject to permanent conservation.

     This means that the first, basic question is keeping the data secure. This means controlling user access and data management permission, given the confidential nature of the data and the obligation to statistical secrecy governing the management of the data. The second matter is the fact that it is impossible to eliminate records, given that the application is designed to record a history of movements. Just as the first question is applicable to all databases, the need to generate a history of movements may not seem necessary, yet it remains so in many other cases. A different matter is that depending on the record in question, it may or may not be necessary to conserve these movements.

     To ensure that these criteria are fulfilled, the only person who has permission to make these entries in the system is the person responsible for management of the Municipal Register of Inhabitants. In addition to this there may be groups of users with specific permission, but this permission is always limited to consultation.

     In regard to the management of the system from a technological point of view, the database can be modified by systems administrators, but these processes must never affect the data themselves.

   - **The documentary form of the Municipal Register of Inhabitants is fixed or not and why**

     The documentary form responds to a specific structure of data specified by law. This

structure may have undergone changes over time, but these changes are always the result of changes made on a legislative level. In general there is an important continuity in the representation of the data.

However, this representation may be affixed in paper or PDF format for certain specific records. In such cases, the variations in data representation are only permitted to affect the style.

In the case of the data extraction that takes place periodically in PDF and microfilm format, the representation is also stable. Files are also extracted in TXT format to ensure that the data can be exploited in the long term.

- **The digital entity is affixed to a stable medium or not and why**

  The authority in charge of the preservation of this computerized continuous register has made the decision to preserve the data in a variety of formats according to the different retention periods. This means for example that the Municipal Register of Inhabitants and rectifications to this are affixed to electronically signed PDF files on a yearly and five-yearly basis respectively, just as used to take place with the paper format. The intention of this authentic copy is to maintain legal security in the medium term. A process of COM (Computer Output to Microfilm) is also used to affix the data to microfilm with a view to ensuring its long-term preservation. Lastly, on an annual, accumulative basis in order to guarantee the exploitability of the data in the long term, the variations in the register are also affixed to TXT format validated with an electronic signature. An assessment process is currently underway of XML format.

  However, this would not involve straightforward substitution; rather the procedure and the actors involved in making these authentic copies have been previously authorized by the competent government authority. This resolution also takes into account the format and the structure that the records must have and by whom they must be validated using an electronic signature.

  The data in the database are stored on the server, just as the extracted files are also stored in PDF and TXT format. A microfilm copy is also produced periodically.

**2. A RECORD MUST PARTICIPATE IN AN ACTION, DEFINED AS THE CONSCIOUS EXERCISE OF WILL BY A PHYSICAL OR JURIDICAL PERSON, AIMED TO CREATE, MAINTAIN, MODIFY OR EXTINGUISH SITUATIONS. A RECORD IS A NATURAL BY-PRODUCT OF THE ACTION.**

The Municipal Register of Inhabitants is a result of the registration of inhabitants in the census of the municipality in which they live. The successive linking of the actions taken by different inhabitants gives rise to the continuous register that is the Municipal Register of Inhabitants.

The processes of updating the register arise from the presentation of declarations and other forms signed by the person in question to the office responsible and also from official communiqués from the National Institute of Statistics (INE), the central Registry

Office and the Ministry of the Interior. In specific cases the City Council can also act of its own motion.

The office checks the documentation provided and proceeds to update the data. In the case of additions or changes to the register in the presence of the person, a document is printed directly from the system and is signed by the applicant.

The types of modification are:

- Additions: births, changes in residence or by omission.
- Removals: changes in residence, deaths and improper entries.
- Changes in residence within the same municipality.
- Changes in personal details: marital status, qualifications, etc.

3. **A RECORD MUST POSSESS AN ARCHIVAL BOND WITH OTHER RECORDS WITHIN OR OUTSIDE THE SYSTEM. THE ARCHIVAL BOND IS DEFINED AS THE RELATIONSHIP THAT LINKS EACH RECORD TO THE PREVIOUS AND SUBSEQUENT RECORD OF THE SAME ACTION AND, INCREMENTALLY, TO ALL THE RECORDS WHICH PARTICIPATE IN THE SAME ACTIVITY.**

The register assigns an identifier to each individual who is registered and also another identifier to each movement associated with the person. The person's identifier features in all of the entries linked to the person, although it may not always be shown on all of the records generated by the system. Nevertheless, in these cases the main data that make up the record (name, Spanish identification number, date, etc.) make it easy to identify the related entries in the Municipal Register of Inhabitants.

The following records are created resulting from the management of the register:

**Registration sheet in the Municipal Register of Inhabitants.** Record generated by the processing of a new registration or the modification of an existing registration. This record is signed by the person authorized to carry out the action in the database and the person requesting the action. Where actions are internal, the record only features the signature of the person authorized to make the change. Registration sheets are created by the following actions:

- **Additions** to the Municipal Register of Inhabitants of the city. It is the document that the citizen takes away with them when their data have been added to the register. The grouping of these records (data) gives rise to the Municipal Register of Inhabitants. If additions are made internally, by the INE or the Registry Office, there is only one copy of the registration sheet. These copies are bound in the form of a registry book.
- **Removals** may be the result of death or a change in the municipality of residence. In both cases the entry is made internally through the list of modifications from the INE, the Registry Offices and the companies providing funeral services. In these cases there is only one copy of the registration sheet, which will be included in the registry books.

- Changes in domicile are carried out on request of the individual, and two copies are printed.
- The personal characteristics correspond to amendments of spelling errors in the name or identification, or to modifications in the level of education or name changes. This can be carried out on request of the individual or internally through the INE and the Registry Office.

**Certificate of inclusion in the Municipal Register of Inhabitants.** This is issued on request of the individual concerned as a result of a consultation of the Municipal Register of Inhabitants to provide proof that the individual concerned is listed in the register. The document is signed by the Secretary General.

**Note of inclusion in the Municipal Register of Inhabitants.** This is identical to the certificate of inclusion in the Municipal Register of Inhabitants with the sole exception that the document is signed by the Statistics Unit.

**Note of cohabiting.** This is similar to the note of inclusion in the Municipal Register of Inhabitants, but in reference to individuals cohabiting in the same dwelling.

4. **RECORD CREATION MUST INVOLVE AT LEAST THREE PERSONS, WHETHER OR NOT THEY EXPLICITLY APPEAR IN THE RECORD ITSELF. THESE PERSONS ARE AUTHOR, ADDRESSEE AND WRITER; IN THE ELECTRONIC ENVIRONMENT, ONE MUST ALSO TAKE INTO ACCOUNT TWO ADDITIONAL NECESSARY PERSONS: THE CREATOR AND THE ORIGINATOR.**

- **The record's author is the physical or juridical person having the authority and capacity to issue the record or in whose name or by whose command the record has been issued.**

  The creation, updating, revision and custody of the Municipal Register of Inhabitants are by law the responsibility of Girona City Council. However, legislation also establishes that the certification of the data of which it constitutes the proof must be issued by the Secretariat General.

  The Secretariat General is also the body responsible for signing the files resulting from the periodic extractions of data.

- **The writer is the physical or juridical person having the authority and capacity to articulate the content of the record.**

  The Statistics Office, under order from the Secretariat General, although it is also the person making the entry.

- **The addressee is the physical or juridical person(s) to whom the record is directed or for whom the record is intended.**

  There is strictly speaking no addressee, although the person registered could probably be included in this category, given that this is the interested party.

- **The creator is the person in whose fonds the record exists.**

The law determines the responsibility of Girona City Council on the management of Municipal Register o Inhabitants. So, Girona City Council is the creator according with his competences.

- **The originator is the person to whom the Internet account issuing or the server holding the record belongs.**

  Girona City Council is the owner of information system applied to Municipal Register o Inhabitants according with his competences.

**5. A RECORD MUST POSSESS AN IDENTIFIABLE CONTEXT, DEFINED AS THE FRAMEWORK IN WHICH THE ACTION IN WHICH THE RECORD PARTICIPATES TAKES PLACE. THE TYPES OF CONTEXT ARE: JURIDICAL-ADMINISTRATIVE, PROVENANCIAL, PROCEDURAL, DOCUMENTARY, AND TECHNOLOGICAL.**

- **The juridical-administrative context is the legal and organizational system in which the creating body belongs.**

  *Juridical context:*

  The competences of Girona City Council in this regard are regulated in general legislation by the local administration, both of the Spanish State and the Government of Catalonia.

  Specific legislation governing the Municipal Register of Inhabitants regulates the specific management of the register and also the conservation of the register for a minimum of 100 years. Notwithstanding the above, the assessment tables of the National Document Access, Assessment and Selection Committee of Catalonia stipulate the permanent conservation of the register due to its great importance for research. This provision therefore makes it mandatory for city councils to take the necessary measures to preserve the register. This became particularly critical in 1996 when legislation determined that it was mandatory for the register to be managed in computerized form as a continuous register, but with the obligation to manage and maintain the history of movements of the population.

  *Administrative context:*

  The municipal organization chart identifies the responsibilities and individuals assigned to the Statistics Office along with its dependence on the Secretariat General, which is responsible for directing it.

  On a political level, the municipal portfolio distributes administrative competences in line with the organization chart.

- **The provenancial context refers to the creating body, its mandate, structure and functions.**

  The statistical function of city councils dates back to the first third of the 19$^{th}$ century. This function was not exercised uniformly by all of the administrations until its definitive regulation in 1870. The creation of Municipal Register of Inhabitants has continued since under the authority of the Secretariat General.

As a result of the increasing complexity of municipal organizations throughout the 20th century, a specific unit was created to manage the municipal census, although we do not know the exact date of its creation. Nevertheless this unit has always been linked to the Secretariat General, which is responsible for it.

The regulation and the specific functions are clearly defined by legislation, as already mentioned earlier in this document.

- **The procedural context comprises the business procedure in the course of which the record is created.**

  *Procedures*:

  All of the entries take place by means of individual data captures which are incorporated into the system. This type of process is valid for additions to, removals from and modifications to the Municipal Register of Inhabitants.

  The periodic extraction of data is of course large scale and limited in time in order to obtain a final summary register.

  *Diplomatic analysis of Procedural Phases in the Creation of the Municipal Register of Inhabitants.*

  a) ***Initiative*****:** The processes of addition and modification to the register as well as the application for documentary proof (certificates, notes etc.) may take place on request of the citizen or by communiqué or request by other public administrations.

  b) ***Inquiry***: The Statistics Office makes the relevant checks depending on the type of action to be carried out. This implies in all cases the verification of data that exist in the register, of the reliability of the documentation provided by the citizen or of the request from other administrations.

  c) ***Consultation*****:** If the checks made by the civil servant provide a positive result, the action directly generates a new entry in the register. However, on some occasions it may be necessary to check the correctness of the data, whether by making a personal appointment with the individuals concerned or by making a verification request to the municipal police or any other public administration body that may be affected.

  d) ***Deliberation:*** The final decision on the validation or otherwise of an entry lies with the person managing the entry. On specific occasions this may be diverted to the manager of the office, and very exceptionally to the Secretariat General.

     ***Deliberation control*****:** Control over the decision adopted to register data is limited to the inclusion of the identifier of the person making the entry. Where reports have been required from third parties to make the decision, such as the municipal police or other administrations, these are conserved as the documentary proof of the verification of the data.

  e) ***Execution*****:** The recording of the data entered in the register implies the execution and validation of the action. Moreover, for addition, removal and data modification actions, a registration sheet is generated automatically that is validated both by the applicant and the Statistics Office in the case of additions

and modifications. In the case of removals, validation is carried out purely by the Office.

- **The documentary context is defined as the archival fonds to which a record belongs and its internal structure.**

  *Documentary context:*

  The documentation generated in the management of the Municipal Register of Inhabitants belongs to the archival fonds of Girona City Council. The activities resulting from its management take place within the framework of the statistical role of the local administration, consolidated from 1870 and developed throughout the course of the 20th Century.

  It is positioned within the functional classification scheme of the fonds of Girona City Council as shown below:

  1. POLITICAL ORGANIZATION AND COMPETENCES
  2. ADMINISTRATIVE ORGANIZATION
  3. ECONOMIC MANAGEMENT
  4. ***TERRITORIAL PLANNING AND MANAGEMENT***

     ***Population management***

     ***Municipal Register of Inhabitants***

     ***Modifications to the Municipal Register of Inhabitants***

     Town planning and management

     Municipal facilities and infrastructure

     Building and land use

     Control of economic activities

     Environmental protection
  5. COMMUNITY SERVICES
  6. PERSONAL AND ASSISTANCE SERVICES
  7. ECONOMIC AND SOCIAL DEVELOPMENT
  8. INTER-ADMINISTRATIVE COOPERATION

  On the specific level of the entry, each one is listed in some way in the activities resulting from its management, such as inclusion in the register, the modification of data, removal from the register or the emission of documentary proof for a variety of reasons.

  These actions produce a variety of documents such as registration sheets for additions, removals and modifications. In addition, actions can result from the activities of the citizen in person, but in some cases a written application is required.

Inter-administrative activities also give rise to communiqués that produce actions reflected in the register (see appendix).

In all cases the records correspond to previously defined administrative structures, the content of which must be adapted to the structure of data stipulated by law, which is as follows:

Obligatory data:

- Full name.
- Sex.
- Place and date of birth.
- School or academic certificate or qualification.
- Other data for the production of the electoral roll.
- Nationality.
- Spanish national identification number or equivalent.
- Usual place of residence.

Additional voluntary data:

- Legal representatives for the purposes of the Municipal Register of Inhabitants.
- Telephone number.

- **The technological context is defined as the characteristics of the technological components of an electronic computing system in which records are created.**

  *Technological context:*

  The specific application used for the management of the Municipal Register of Inhabitants has been developed by Girona City Council using Oracle. The application was designed and implemented independently of any other platform in order to facilitate control over access, as stipulated by law.

  In regard to technological preservation, in addition to the application of the corresponding policy governing security copies, active maintenance is guaranteed by the fact that this register is used continuously and intensively.

  The fact that its regulation is governed by very precise legislation means that the policies or procedures in place for its management are not conditioned by technological aspects. However, this model is not applicable to other records or functions that are fully managed in databases, with the exception of accounting registers. In this regard, the management of the Municipal Register of Inhabitants can be a very helpful analytical tool for the definition of a template of functional requirements to be applied.

# Appendix DIPLOMATIC ANALYSIS

## Modifications to the Municipal Register of Inhabitants

| Category | Type | Source | Documents |
|---|---|---|---|
| **ADDITIONS** | **Birth** | In person<br>INE | Official communiqués<br>Registration sheets<br>Authorization of inclusion in the Municipal Register of Inhabitants<br>Application to third parties<br>Authorization of the parent who does not have custody of the minor<br>Accreditation documents |
| | **Change of residence** | In person | |
| | **By omission** | Internal (City Council)<br>In person | |
| **REMOVALS** | **Change of residence** | INE | Official communiqués<br>Accreditation documents |
| | **Death** | INE<br>In person<br>Funerària Poch | Official communiqués<br>Registration sheets<br>Accreditation documents |
| | **Improper entry** | INE (fraud)<br>Internal (City Council) | Application for exclusion<br>Notifications<br>Report from the Electoral Register Council |
| **CHANGES IN RESIDENCE** | | In person | Registration sheets<br>Authorization of inclusion in the Municipal Register of Inhabitants<br>Application to third parties<br>Accreditation documents |
| **PERSONAL DETAILS** | | In person<br>Registry office<br>Ministry of the Interior<br>INE | Official communiqués<br>Registration sheets<br>Authorization of inclusion in the Municipal Register of Inhabitants<br>Application to third parties<br>Lists of new national identification numbers |
| | **Renewal of registration** (foreigners from outside the EU with no residency permit; every 2 years) | In person | Registration sheets<br>Authorization of inclusion in the Municipal Register of Inhabitants<br>Application to third parties<br>Accreditation documents |