InterPARES 2 Project
International Research on Permanent Authentic Records in Electronic Systems

Overview

Case Study 20:
Revenue On-Line Services (ROS)

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The Creator Context / Activity
Creator: Office of the Revenue Commissioners of Ireland (a.k.a. "Revenue")
Creator type: Government focus / Public sphere (central or federal administration)

Juridical context: The Office of the Revenue Commissioners is a public body that was established by Government Order 2/23 (Revenue Commissioners Order) on February 21, 1923, to collect and manage taxes and duties within the Irish Republic. Other pertinent legislation includes:

- Official Secrets Act, 1963 (Revenue Certification Practice Statement, Section 1.1.9 Staffing Arrangements invokes the OSA in terms of Revenue Employees)
- Freedom of Information Act, 1997
- Taxes Consolidation Act, 1997
- Data Protection Act, 1988 & 2003
- E-Commerce Act, 2000
- Capital Acquisitions Tax Consolidation Act, 2003
- Official Languages Act, 2004
- Tax Treaties (double taxation agreements with forty-four countries regarding income, corporation and capital gains taxes)

Activity: The overall activity of Revenue is the assessment and collection of taxes and duties. The activity in question for this case study is the electronic filing of tax returns and payment via the Web-based Revenue Online System (ROS). "ROS is used to replace paper-based transactions, maintain existing levels of confidentiality and incorporate a level of security into an electronic transaction." (FR 8)

Registered users have the choice of six potential activities:

1. File a tax return with payment.
2. File a tax return without payment.
3. Upload a completed tax return.

4. Make a payment.
5. Complete a Debit Instruction.
6. Download a Debit instruction form for completion.

The activity being studied here has been recognized as innovative. Although collecting taxes is as old as time, the way in which Revenue handles this activity can be seen as a **new business practice**. Among the various recognitions that Revenue has received are the Public Sector Times Award for best e-Government Web site, the Irish Internet Association Award for best example of Public Service e-Commerce implementation in the Public Service and the Digital Media Award for Innovation in business-to-business.

ROS is not only a new activity, but one that is constantly renewing or improving itself. The final report states that "ROS is in continual development and Revenue are rolling out newer versions of the application on a phased basis." (FR iv)

Nature of Partnership

Overall Maintenance of ROS has been outsourced to Accenture. Maintenance of back-office systems (to which ROS interfaces records input by customers) is handled by both in-house and outsourced staff, in the case of the Integrated Tax Processing system, and by in-house development teams in the case of other back office systems. An outside data processing contractor uses a bulk filing facility to upload employee cessation certificates (P45s) to ROS. Debit Instructions are exported from ROS to the back-end systems and to financial institutions requesting payment. Financial instructions are sent directly to banking systems based on a dedicated infrastructure linking them to Revenue.

Revenue itself acts as the certifying authority (Revenue Certification Authority is the creating agency for digital certificates). However, Revenue employs Baltimore Technologies as the sub-contractors for digital certificate creation using Baltimore's UniCERT product.[1] A related area to certification is user management, which oversees the creation and allocation of authorized users in accordance with the ROS Access Control System.

Bureaucratic/Organizational Structure

Revenue is directly responsible to the Minister of Finance, but acts independently of ministerial control in exercising statutory powers. Its headquarters are in Dublin, with over 100 regional offices throughout Ireland that employ a staff of over 7,000. There is a Board of Directors comprising three Secretaries General (one Chairman and two Commissioners), with an administrative structure made up of sixteen divisions, organized into five geographic revenue regions.

Digital Entities Studied

Together, the three digital entities under study facilitate fast tax assessment and payment/collection on the part of Revenue and tax payers in a convenient, accurate and confidential manner. These digital entities are:

[1] Following the sale by Baltimore Technologies of their securities business, Revenue issued an RFT with a December 2003 deadline for a new service provider to host, manage and support the Public Key Infrastructure for the Revenue Online Service. The new PKI service provider is LanCommunication / RSA Security.

1. Digital certificates and signatures, which provide online user verification and validation to ensure protection of personal information and integrity of submitted data.
2. Electronic tax forms (22 available), which may be completed and submitted online.
3. Debit Instruction Forms, which allow customers to pay their taxes online.

Documentary Practices Observed

Integrated Taxation Processing or ITP is a computer **system** that handles the majority of Revenue's tax records. The system is a proprietary development based on an Ingress II database. "The n-tiered system architecture separates some of the functionality of the record-making and recordkeeping systems using business rules to dictate the records contained in the subset stored within ROS." (FR 2)

Record Creation and Maintenance

There are controls over the creation, maintenance, and use of records. In terms of **guidelines** or manuals, two Revenue documents govern the use of digital certificates and signatures. There is also a certification policy statement and a certification practice statement. In addition, "all three entities take the form of structured data that is packaged according to requirements as either a delineated flat file or XML. The pages are presented in a compatible Web browser and are rendered using standardised style sheets." (FR 14)

The main records **creation activity** within ROS is the filing of electronic tax forms. Electronic tax forms are created when users download and file one of 22 available forms. "The formal act of signing and submitting a tax form to Revenue via ROS is considered a transaction and evidence of a record." (FR 13) Digital certificates and signatures are created and delivered when users apply for an ROS Access Number or Tax Agent Identification and a separate password and Digital Certificate. Debit Instruction Forms are created when users pay their taxes online. The system is also designed for the capture or "ingest of offline created tax forms." (FR 2)

The three digital entities studied are all created and **captured** automatically by the system, with input from the user (taxpayer). ROS is even described as "a digital capturing and publishing system…in a secure online environment." (FR 4)

As a means of **organizing** its records, the system has a basic classification (active or inactive). Following the discharge of any financial liability on the part of a taxpayer, records are held in the live system but classified as inactive. There is also a type of **aggregation** of records, in that all tax records and debit instructions are saved chronologically. They are viewable within the Revenue Customer Information Service and may be sorted and viewed depending upon the field type selected.

The system keeps track of **changes**, which are noted and logged with a time/date stamp and the name of the employee making the change. However, changes seem to be limited to Revenue employees. "Should a user later identify mistakes that were not identified by the system prior to submission of the form to ROS, s/he must contact the relevant tax office directly to request that the mistakes be corrected." (FR 49)

It should be noted that changes may be made to a return in progress (draft return), but not to a submitted return. "Whether working online or offline, a user can save, update, and resave a draft return as often as needed prior to formally signing and submitting the final version." (FR 52) ROS considers a user's clicking of the 'Sign and Submit' button a formal declaration that the return being submitted is complete; consequently, no subsequent changes or revisions can be made to that submitted version." (FR 52)

The question of **metadata** use is addressed directly in the final report at a bare minimum. It seems to be answered instead by several "in-house" concepts. First, by the capture of what is known as the "security wrapper." The "security wrapper" is "the entire transaction dataset received from the customer by ROS. This includes the transaction element, i.e., tax return and payment instruction, as well as the 'security packaging' element, i.e., digital signature, date/time-stamp, etc." (FR 25) Another possible use of metadata may be in data transfer. "As ROS rearranges data for transfer to ITP [Integrated Tax Processing] and other systems, there may be additional strings of structured data types being generated and exported." (FR 27) It is possible that these addition strings may be metadata identifying or describing the transferred data, though this is not specified in the final report.

"Metadata related to the expired certificates, *in addition to the security wrapper*, is maintained within ROS." (FR 53, emphasis added) Although an Irish Public Service Metadata standard exists, it is not used with ROS. Nonetheless, "twenty-two schemas for the tax forms available via ROS are publicly available in XML DTDs for inclusion in ROS-compatible software developed by third parties …Each schema includes a DTD and element definitions and explanations." (FR 66) The standards for these schemas are based on institutional practice.

Recordkeeping and Preservation

Revenue has a recordkeeping and archives **system** in place that is automated where possible. The main application hosting and maintaining the digital environment is an Advantage Ingress 2.5 Relational Database. Core customer data is **refreshed** on a nightly basis from the corporate Integrated Taxation Processing back office system. The system does not keep all of the digital entities created. The digital certificates are only valid for two years, following which new ones are issued. The security wrappers generated when filing tax returns are retained only in ROS. The system does not retain the debit instruction forms. Instead, "a record of the RDI [ROS Debit Instruction] is retained in the ROS system and linked to the tax type(s) indicated by the user when establishing the RDI [and] the entity [is] transferred to the financial institution for payment authorization." (FR 41)

Although standard IT **backup** and disaster recovery operations are in place, archival or juridical considerations are not behind the **preservation strategies** used for ROS. "Work practices and increased use of IT are driving the retention and preservation of [tax] records, rather than any legislative need." (FR 62) However, the long-term preservation of tax records is viewed as "not appropriate," due to the high level of personal information included in them "and their lack of suitability for archival purposes." (FR 63)

As part of these strategies, Revenue holds electronic tax records within the system for a certain amount of time according to **retention guidelines**, then destroys them (an authorization from the

National Archives is required to destroy tax forms and other records). There is no defined retention period to date for tax forms and "it is reemphasized that these records are not considered archival and will be destroyed after an as yet unspecified period of retention." (FR 62) "Security wrappers" are held in ROS indefinitely.

With regards to **obsolescence** and technical dependence, there is some paradox. On the one hand, the final report states that records are migrated when back-end systems are updated and that XML is used as the export standard to enable **migration** to future systems. On the other hand, the final report also states, "There are no specific plans to migrate records in the future. In fact, it was noted that when migrating to new systems, Revenue may decide not to migrate all records and allow older, inactive records to remain on older system or else archived to offline storage." (FR 62) Can it be inferred from this apparent contradiction that migration was carried out when developing and improving the system, but no further migration is envisioned?

The system also uses open source, off-the-shelf packages where appropriate. However, ROS required the development of a proprietary Java-based Off-Line Launcher for the submission of off-line tax returns. The final report also acknowledges that "proprietary technology used to create digital certificates may have long-term implications." (FR 61)

An open approach is taken in regard to **interoperability** with third party software. "Revenue…allows for their XML DTDs to be obtained for inclusion in third party software. This open approach is to ensure compatibility and maximize take-up of the electronic-based system." (FR 9)

Accuracy, Authenticity and Reliability

The recordkeeping and archives system at Revenue seeks to ensure the quality, reliability, authenticity, non-repudiation, and confidentiality of tax records created within ROS.

Accuracy

The purpose of ROS is to facilitate fast tax assessment and collection/payment in a convenient, accurate, and confidential manner. In addition, "The claims that the system meets requirements for authenticity, accuracy and integrity of data were also examined, particularly in the light of the *Irish E-Commerce Act of 2000*, which received input during draft stages from The Revenue Commissioners." (FR 2)

The question of accuracy was at the heart of ROS. "ROS was consciously promoted as a means to reduce errors in tax returns, as the Commissioners had found that nearly 20% of all returns were inaccurate or contained human error." (FR 2) In addition, "tribunal mentality has highlighted the need to present accurate financial records over time, and Revenue are conscious of this." (FR 62) To respond to this need, "The system performs a set of validations to ensure that some of the data fields populated by users are accurate and can be checked using business logic." (FR 2)

Individual tax returns are checked for accuracy. "Once a return is signed and submitted, the ROS system performs a final validation on the form and will reject any form that fails this validation." (FR 42) Various validation controls are used to assist clients in inputting data (field validation, cross-field validation, basic calculators). However, Revenue disowns any responsibility for the

accuracy of individual tax returns. Revenue's terms and conditions #1.6 states, "In the event of and in your transmitting material to Revenue using ROS, Revenue has no responsibility for the accuracy, veracity and completeness of same and for any errors in the manner of its input." (FR 49)

Authenticity

All correspondence (transactions) between the customer and ROS is encrypted using Public Key Infrastructure (PKI) technology to control access to the system and prevent the interception and tampering of records. "Revenue regards the use of PKI to offer twofold protection of the authenticity of its digital entities by ensuring: (1) the identification and authentication of all communicating parties, and (2) the non-repudiation of transmissions." (FR 51) There is no direct access to the back-end systems. ROS is not considered a dynamic system, since "evidential and authentic weight occurs only after the formal signing and sealing." (FR 3)

ROS customers are identified by their digital certificate. "The digital certificates themselves are used as a measure of authenticity for the tax forms and debit instruction forms." (FR 48)

"Revenue regards the digitally-signed electronic records as acceptable in law and believes that this claim is bolstered via a **chain of authenticity** created by compliance with the following steps:

1. Authentication and identification of users through the use of RANs and digital certificates;
2. Validation by ROS of all submitted data;
3. Retention, logging and archiving of all actions within ROS;
4. Prevention of the deletion or modification of entries from ROS Inboxes; and
5. Time/date stamping of all actions within ROS." (FR 51)

Reliability

At least part of the reliability of the system is based on public perception of it and their comfort or familiarity with the system. "ROS is deliberately configured and presented so that the electronic forms mirror paper forms." (FR 9)