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International Research on Permanent Authentic Records in Electronic Systems

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Electronic Filing System (EFS) of the
Supreme Court of Singapore

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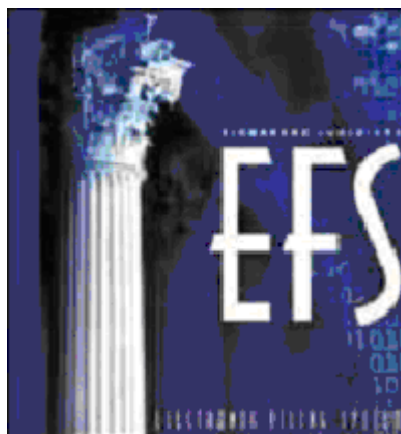


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A. Overview of the Case Study

This case study was approved by the InterPARES 2 International Team during the September 2003 workshop in Los Angeles. The records generated from the case study relate to Focus 3, as they are a by-product of government activities in an interactive environment.

The Electronic Filing System (EFS) of the Supreme Court of Singapore facilitates the filing of Court records by law firms and enables the speedy retrieval and access of records and information through an electronic information system. With the implementation of the EFS, law firms can electronically submit and sign their legal records to the courts online at all hours, without sending their clerks to wait in line at the courts' registries. They can also serve records to other firms electronically. Searches on relevant case information and extracts of records can also be done online without the need of on-site inspections at the Court registries. To date, the system has a total of over 1.5 million records, comprising about 20 million pages, creating a fully electronic civil registry for both the Supreme and the Subordinate Courts.

The EFS provides a good case study for an analysis of the reliability, accuracy and authenticity of electronic records as the system is comprehensive and has a tremendous impact in the delivery of e-government services within the context of Singapore's juridical framework. Due to the complexity of the business process and juridical context that governs the creation of various types of case files created within a single system, this case study examines the EFS specifically in relation to the filing of bankruptcy petitions and summons in chambers bankruptcy.

Some of the issues that are addressed in this case study include:

- The documentary form of the records, such as their formal elements and attributes when they are created in the course of a business activity;
- Measures taken by the Court to ensure the accuracy, reliability and authenticity of its recordkeeping system, such as the policies, procedures and standards formulated by the courts; and
- Appraisal and preservation of records created in the EFS.

B. Statement of Methodology

The methodology consisted of:

- A focused walk-through of the system with the record creators to understand the business processes relating to the filling of bankruptcy petitions and summons in chambers bankruptcy as well as the documentary form of the records;
- Interview questions via e-mail and/or scheduled meetings with registry staff, IT personnel and Assistant Registrars; and
- Research on various legislation that has an impact on the recordkeeping system, including:
 - *Bankruptcy Act* (1995)
 - *Bankruptcy Act (Commencement) Notification* 1995
 - Practice Direction of the Court, 6 September 2004

C. Description of Context

The EFS is an integrated workflow online system that closely mirrors the paper-based system. The main features of the EFS are as follows:

- **Electronic Filing System**
Allows law firms to file records from their office to the courts either from their office or through a service bureau.
- **Electronic Extract Service**
Allows law firms to search for an index of the records and to submit a request to the courts for extraction of copies of records from the case files.
- **Electronic Service of Records**
Allows law firms to serve records to other law firms electronically.
- **Electronic Information Service**
Allows law firms, businessmen, creditors, bank officers and members of the public to search for relevant case information online.

The EFS has received a number of local and international awards for its pioneering and innovative use of information technology (IT). For instance, it was awarded the Managing Information Strategies Innovation Award and the e-Asia Award in the E-business category in 2003. However, there have been some operational problems with regard to the implementation of the EFS, such as the increased time spent in scanning records to court and increased litigation cost due to the imposition of filing fees. In addition, most judges and lawyers preferred to print and rely on hard copies of the documents during trials and hearings as they felt it was more efficient due to the “dynamic process of a trial” and also because of “instability and intermittent slowness of the system.” This has to some extent, defeated one of the objectives of the EFS, which is to encourage the establishment of electronic hearings or Technology Court. In April 2003, the EFS Review Committee reviewed the system and made some recommendations to address its weaknesses and to effectively meet the needs of law firms. Some of its recommendations were implemented in October 2003. The review of the EFS is an indication of the Court’s commitment to obtain feedback from its users and consciously improve the system’s functionalities. It is also a reflection of the current mode of thinking behind the current civil service’s e-government Action II plan (2003-2006) to achieve three desired outcomes of the e-citizen experience: delighted customers, connected citizens and networked government. In this aspect, it is pivotal for the Court to improve its system and to effectively meet the needs of its users.

Provenancial Context

Mandate

The mandate of the Supreme Court is to ensure the administration of justice by establishing “an efficient and effective court to enhance access to justice and instill public trust and confidence in the court system” as specified under Article 93 of Singapore’s constitution. This is achieved through adherence of the Court’s four core values consisting of the following:

- **Integrity**
Amongst these four core values, integrity is perceived as the most important as the “public must be assured that court decisions are made fairly, that court staff are incorruptible, and that court records are accurate.”
- **Quality Public Service**
The Supreme Court is committed to delivering quality public service through focusing on the needs of its customers (court users), “with emphasis on accessibility, quality and the timely delivery of services.”
- **Learning and innovation**
These values are an important component of the Court’s continuous efforts to improve its work processes and to bring them up to the “highest levels of performance.”
- **Ownership**
The Supreme Court endeavours to inculcate a sense of ownership in its workplace and “value the contributions” of its staff.

The development of the EFS was one of the various measures taken by the Court to clear its backlog of cases in the early 1990s. The EFS was part of the Court’s strategy to reform the judicial system, fulfil its mandate, and achieve its overall aim of “being a world class judiciary.” Since its implementation in March 2002, the EFS has revolutionized the administration of civil cases in the courts. In fact, Singapore is the first country to implement compulsory filing of civil litigation cases. The automated workflow of the EFS has supported the Court’s commitment of providing quality public service as it has allowed the courts to be more efficient in monitoring cases. The needs of the law firms (who are the Court’s customers) are also met as they can use the system at all times, instead of sending their clerks to queue at the Court’s registry counters during office hours.

Structure and Functions

The Supreme Court presides over civil and criminal matters and is composed of the following legal entities:

- **Court of Appeal**
The Court of Appeal is “Singapore’s final court of appeal” and it hears appeals from judgment passed by the High Court for civil and criminal cases. It also has the juridical authority and statutory mandate to decide on “any point of law” by the High Court.

- **High Court**
The High Court is accorded with “general supervisory and reversionary jurisdictions.” It hears cases on admiralty matters, company closures, bankruptcy proceedings and petitions for the admission of advocates and solicitors. It also hears civil appeal cases from District Courts, Magistrates Courts and the Small Claims Tribunals. Except for probate cases, civil cases exceeding \$250,000 are heard at the High Court.
- **Constitutional Reference Tribunal**
The President may refer to questions relating the provision of the Constitution to a tribunal.
- **Supreme Court Registry**
The Supreme Court Registry is made up of various legal counters such as bankruptcy, writs of summons, probates, and orders of court. It fulfills both administrative and juridical roles and is responsible for the “processing, registration and custody of records.”

Juridical-administrative Context

The juridical regulations of the Court govern the business process and documentary forms of the records.

The two main pieces of legislation governing the filing and serving of bankruptcy records are the *Bankruptcy Act, 1995*, and the *Bankruptcy Act (Commencement) Notification, 1995*.

Bankruptcy Act (1995)

The act states the conditions needed for instituting bankruptcy petitions and order. Under the act, creditors can file proceedings against a debtor who, amongst other conditions, has resided in Singapore or who carries out his business through an agent in Singapore. The debtor must owe his creditors at least \$10,000. A bankruptcy petition will be served if the debtor does not comply with a statutory demand and does not pay the creditor within 21 days.

Bankruptcy Act (Commencement) Notification (1995)

Also known as Bankruptcy Rules, the rules state the proceedings involved in bankruptcy, and detail the various documentary forms, such as the statutory demand, bankruptcy petition and bankruptcy order.

- **Statutory Demand**
The rules state the various types of information that must be supplied in the documentary form of the statutory demand, such as the amount of monies owed by the debtor. The form must be “dated and signed by the creditor himself or by a person authorized to make the demand on the creditor’s behalf.” The rules also specify the business procedures. For instance, the statutory demand “must include an explanation to the debtor” of a number of matters such as the right of the debtor to set aside the demand within fourteen days and the “methods of compliance available to the debtor.” Section 96, Part 4 of the rules also

states the various steps taken by the creditor to serve the demand to the debtor, which include:

- “Posting the statutory demand at the door or some other conspicuous part of the last known place of residence or business of the debtor or both;”
 - “Forwarding the statutory demand to the debtor by prepaid registered post to the last known place of residence, business or employment of the debtor;” and
 - Advertising the statutory demand in the local newspapers.
- **Bankruptcy Petition**

The documentary and procedural controls of the bankruptcy petition are also clearly spelled out under Sections 96-108 of the bankruptcy rules. For instance, one of the business procedures of the rules states that the bankruptcy petition must “state the date and manner of service of the statutory demand and that to the best of the creditor’s knowledge and belief, the demand has neither been complied with nor set aside and that no application to set aside is pending.” The bankruptcy petition must be filed by the creditor within four months from the date the statutory demand was served to the debtor. To prove that the bankruptcy petition is served to the debtor, the rules state that it must be accompanied by an affidavit that should state the date and time the sealed copy of the petition was served to the debtor.
 - **Bankruptcy Order**

The creditor should serve “not less than 2 sealed copies of the bankruptcy order on the Official Assignee,” who in turn should serve the sealed copy of the order to the bankrupt. The Registrar of the Court will then “cause a notification of the order to be published in the Gazette” and the Official Assignee will advertise the names of bankrupts in local newspapers.

Electronic Transaction Act (1999)

The above Act provides the legislative framework for the implementation of e-filing services within the government. Section 3c of the Act states that one of the objectives of the Act is to “facilitate electronic filing of documents with government agencies and statutory corporations, and to promote efficient delivery of government services by means of reliable electronic records.”

Procedural Context

The procedural context of the EFS is closely tied with the juridical-administrative context of the Supreme Court. Besides the Bankruptcy Rules, the procedural context of the EFS is also determined by other regulations, such as the Rules of Court 1997 and the Practice Direction.

Practice Direction No. 7 of 2003 states that “any proceedings or applications under the Bankruptcy Act or Bankruptcy Rules filed on or after 28 May 2002” must be done through the EFS. Records can either be filed electronically or via a service bureau but must be submitted in

relation to the same case. The Court has the right to reject the submission of a record in hard copy if it can be converted into an electronic format.

In addition, the Bankruptcy Section from the Supreme Court has formulated an internal procedures manual and workflow chart on how its staff processes the filing of bankruptcy petitions. The workflow briefly describes the business process and provides a checklist for the Court's registry staff.

The general business procedure on filing of bankruptcy petitions and orders is as follows:

a. Procedures on the Filing of Bankruptcy Petition

The petitioning creditor can proceed to file the bankruptcy petition if the debtor does not comply with the statutory demand within fourteen days. The bankruptcy petition must be filed within four months from the date the statutory demand was served to the debtor.

The registry staff should check that the following documents are submitted:

- Creditor's bankruptcy petition;
- Lodgment Form: interbank payment form of \$1,600 by the creditor to the Official Assignee;
- Affidavit of Truth of Statements in Bankruptcy Petition: law firm will submit to the court stating that they are the solicitor of the petitioning creditor and that they have the "knowledge of the subject matter of the action";
- Affidavit of Service: affirmation by the law firm on their efforts to serve the statutory demand to the debtor; and
- Power of attorney or authority: law firm authorizing their solicitor to sign and present the bankruptcy petition on their behalf against the debtor.

The registry staff check: (1) the documentary form of the record, (2) that the record is duly signed and dated and (3) that the details of both the petitioner and the debtor are correctly entered in the record profile of the EFS. They also ensure that the business process is adhered to according to the various legislations governing the filing of bankruptcy petitions. If the records are in order, registry staff fix a hearing date, annotate the petition with the Court's seal and signature of the Registrar and forward it to the law firm.

The Supreme Court also sends a copy of the petition and the lodgment form to the Official Assignee through the EFS.

The law firm must serve bankruptcy petition to the debtor at least seven days before the date of hearing of bankruptcy petition.

b. Procedures on the Filing of Summons in Chambers Bankruptcy

If the debtor cannot be found at his/her place of residence or business address, then the law firm must apply for a draft Order of Court for Substituted Service of Creditor's Bankruptcy Petition

The submission of the above records is clearly spelled out in the Bankruptcy Rules. Section 110 of the Bankruptcy Rules states that "if the court is satisfied by affidavit or other evidence on oath that prompt personal service cannot be effected because the debtor is keeping out of the way to avoid service of a creditor's petition, or for any other cause, the court may order fit substituted service to be effected in such manner as it think fit."

The law firm must first submit a draft order of substituted service. The Court registry then checks that the information is accurate, such as summons in chambers number and the date the affidavit was filed, and, if accurate, approves the draft order.

Once the draft order is approved, the law firm submits the engrossed order and the Court then affixes the seal of the Court and the signature of the Registrar.

Besides the engrossed order of substituted service, the law firm submits the following records:

- Ex-Parte Summons in Chambers, which states that the posting of the bankruptcy petition and the order of substituted service on the front door of the debtor, or delivered to the debtor by post, is deemed "good and sufficient."
- Affidavit in Support of Application for Substituted Service, which documents that all reasonable efforts and attempts have been made by the law firm to serve the bankruptcy petition to the debtor.

Registry staff check the application, annotate the Court's seal and Registrar signature and forward it to the Duty Registrar for ex-parte hearing. The Duty Registrar annotates the Court's decision and returns it to the registry staff who annotate it with the date and time of hearing.

c. Procedures to Document that the Bankruptcy Petition was Effectively Served

The petitioning creditor, through its solicitor, must submit the following to the Court to document that the petition was served successfully to the debtor:

- Creditor's Bankruptcy Petition—petition to the Court that a Bankruptcy Order be made to the debtor.
- Affidavit of Service—statement by the law firm on how the petition and order of substituted service was served to the debtor
- Affidavit of Non-satisfaction—statement by the law firm that the petitioning creditor has not received payment from the debtor

Registry staff check that petition is in order, affix the seal and signature and annotate the date of hearing, which is generally within six weeks from the date of hearing.

d. Procedures and Documentary Forms in Preparation of Bankruptcy Hearing

Bankruptcy cases are typically heard every Friday afternoon. The master diary showing the schedule of cases of various Assistant Registrars and Registrars is circulated to registry staff at Supreme Court. Registry staff will assign the relevant cases amongst the Assistant Registrars and proceed to prepare the hearing list. The hearing list is then uploaded onto the Supreme Court Web site, which is accessible to the public. Official Assignee is informed of the date of the hearing via e-mail. A hard copy of the list is also posted on the Supreme Court's notice board. The Court is currently in the process of replacing the notice board with an information kiosk. The registry staff then assign the case files to the Assistant Registrar electronically and send the hearing list to them.

The Duty Registrar conducts the hearing and records the proceedings of the hearing and the decision of the Court on the minute sheet in hard copy. Registry staff scan the minute sheet into the EFS.

Registry staff document the results onto the hearing list and in the EFS. The hearing list is then forwarded to the Duty Registrar for verification. The approved results of the hearing list are then faxed to the Official Assignee, who then sends a correspondence to the debtor to declare his/her assets, once the Court decides that a bankruptcy order is granted.

e. Procedures Involved Once the Court Grants a Bankruptcy Order

At the Court

- Registry staff print out the report of the hearing from the EFS of the list of bankruptcy order made and verify the accuracy of the information against the hearing list. The report is converted to MS Word and then e-mailed to the Government Printer, SNP Corporation;
- Registry staff check the draft gazette from SNP before they proceed to publish the gazette;
- Photocopies of the gazettes on bankrupts are then forwarded to the Official Assignee; and
- The published copy of the Government Gazette is then scanned and filed into the electronic case file.

At the Law Firm

- The law firm submits the draft bankruptcy order to court for approval;
- The Court checks the draft order against the minute sheet of Duty Registrar;
- Once approved, the draft order is sent back to the petitioning creditor's solicitor;
- The law firm then sends engrossed bankruptcy order to court; and
- The Court checks the engrossed bankruptcy order against the approved draft and confirms that the court fees are paid before accepting the engrossed bankruptcy order, which is then affixed with the electronic seal and stamp.

Documentary Context

The Supreme Court has a uniform file classification scheme comprising all cases such as bankruptcy, probate and summons in chambers.

The file classification of bankruptcy records in the EFS mirrors its previous paper-based filing system, with some modifications. In the traditional paper environment, the record profile of the case file comprises the case number and the name of the debtor. However, the EFS bankruptcy case file comprises not only the case number and name of the debtor but also the name of petitioner, case status (pending or concluded) and the bankruptcy status (bankruptcy order, adjourned or withdrawn).

The file reference number of the case file is based on a running order, according to the year the petition was filed (electronically generated). For example, the case number B2/2004 denotes that this was the second bankruptcy case handled by the Court in the year 2004.

The traditional paper environment also has an index of documents within the case file, which functions as a record register. The register includes the record profile of the various types of documents related to the case, the document number and the date the documents were filed. In the EFS, the record register exists in the form of sub-directory. Compared to the paper based system, the record register in the EFS has an additional record profile- the originator of the document (the person who created the record).

The documentary structure of the EFS is closely integrated with the business process and its related legislations. The naming conventions of the records created under the EFS are clearly stated under the Bankruptcy Rules and Act as well as in the registry's internal workflow.

Technological Context

Essentially, the EFS is an integrated workflow application and document imaging system. The main technological environment of the EFS is as follows:

a. Recordkeeping system at both the law firm and at the Supreme Court

The EFS is built on a "hybrid architecture." The law firm's module uses a Web-based interface and is developed on Java/J2EE technology, WebLogi Application server and Oracle database. The Court's workflow and recordkeeping system uses Visual basic, Oracle database and Filenet document management system. The service bureau acts as a gateway between the law firm's front-end module and the Courts' application system. For instance, it ensures that fees are electronically computed and routes records to the Court's respective registries.

b. Storage of Case Files by the Supreme Court

All case files at the Court's end are stored onto WORM (Write Once Read Many) optical disks in a jukebox.

c. Security of Recordkeeping System

To ensure the authenticity of the records when it is transmitted over space, the EFS system has a Public Key Infrastructure (PKI) to digitally sign and encrypt records created through the EFS. The Supreme Court acts as an independent certificate authority and issues a unique smart card that is tied to each solicitor at the law firm. Solicitors have the choice of encrypting their records using the Smart Card before submitting them electronically to the Supreme Court. Even if the records are not encrypted over at the law firm's end, the presence of the Secure Sockets Layer between the law firm and the EFS Service Provider's server ensures that records are transmitted securely to the courts. In addition, the use of hardware encryptors ensures the secure transmission of records between the EFS Service Provider and the courts.

D. Narrative Answers to the 23 Core Research Questions

1. What activities of the creator have you investigated?

As the EFS has several modules, this case study has concentrated on the processing, registration, maintenance and preservation of bankruptcy records, which is under the purview of the Insolvency Section under the Legal Directorate. The Section helps to administer effective case management in the courts, which is defined as the "processing, management and disposal of a case."

2. Which of these activities generate the digital entities that are the objects of your case study?

The main activities that generate the creation of digital entities are as follows:

- Setting up of Front End Application System by Law firms to Submit Court Records

Law firms must first register themselves and be issued with smart cards from the Supreme Court, which acts as the Certification Authority. Only solicitors with valid practicing certificates can apply for the Smart Card. Law firms have been advised to impose internal controls of the usage and delegation of the Smart Card as the "sole responsibility concerning with the security, authorization and delegation of the usage of the Smart Card lies with the holder of the Smart Card and the firm."

Subsequently, the law firm has to register themselves for an EFS account and download the front end software from the web.

- Gateway Application System

This application is an intermediary system between the law firm and the court. It essentially routes the submission of court records from the law firms to the court, computes fees, downloads code tables to the law firms and performs other validations on the law firms' submissions.

- Court's Internal Workflow Application

The application is based on the business processes of the court and allows the court's users to process, route and approve the submission of court records by law firms as well as to generate reports and statistics.

- Creation and Maintenance of Digital Certificates through the Key Management System

All EFS users (both court users and law firms) are required to apply for a certificate to the Certificate Authority, which is operated by the Supreme Court. The Key Management System manages the digital certificates, which is composed of the following components:

- Certificate Authority Management System, which is managed by the courts and issues, revokes and manages digital certificates. It is a PC based network that is linked to the certificate server through a standalone PC. The certificates are stored and maintained in the Certificate Server and runs on UNIX.
- Certificate Client System, which provides the management of smart card, request and receiving of certificates and viewing of smart card profile at the law firm site.
- Key Generating Software, which runs on the law firms' PC and allows law firms to generate their own public and private key, obtain the public key certified by the Court's Certificate Authority administrator and update it in the smart card.

3. For what purpose(s) are the digital entities you have examined created?

The overall objectives of the EFS are as follows:

- improve efficiency and shorten the time taken to process cases;
- encourage pro-active management and tracking of cases as well as streamline the workflow processes;
- provide an integrated information system and enable different parties to simultaneously view the same case file;
- facilitate the filing and retrieval of court records; and
- improve case file security.

The purpose of the front end application system is to "reduce the labour intensive nature of modern litigation by reducing reliance upon court clerks." With the EFS, law firms submit records electronically to the courts instead of sending clerks to physically file records to the Supreme Court. Moreover, the filing of court records was made compulsory in 2002.

The purpose of the Court's internal workflow application system is to allow the courts to effectively manage cases. It is also part of the Court's move towards e-government to facilitate the process of civil litigation through e-filing and electronic information services as well as to implement the use of electronic records in electronic chambers or electronic courts (Technology Court).

The purpose of the key management system is to identify the filing party and the court user.

4. What form do these digital entities take? (e.g., e-mail, CAD, database).

The EFS is composed of standardized HTML style sheets, XML files, Visual Basic and PDF records generated by various processes as follows:

At the Law Firms' Front End Module

- creating new case files by entering profiles in standardized Web pages, composing cover page templates in HTML and submitting records to court in PDF;
- working on incoming and draft messages such as replies from court that are in standardized HTML pages;
- submitting data fields, based on standardized HTML style sheets, and accompanying PDF records to court;
- requesting automatic service of records on recipient law firms and at the same time filing of the records to court—this requires filing in data fields in Web pages and submitting accompanying court records that are in PDF;
- viewing the status of the submission of records to court and to and from other law firms that are both in HTML and PDF;
- searching for existing case files;
- generating reports; and
- using key generating software and maintaining smart cards.

At the Court's Internal Workflow Application System

- The software for the in and out trays of records of the Court's application system is in Visual Basic. The Insolvency Section that processes bankruptcy records also views case files relating to bankrupt companies and to limited liability partnership cases;
- The profile of the records that is initially entered by the law firms is subsequently added and/or updated by the Court; and
- Legal records submitted to court by law firms are in PDF.

During Creation of Digital Certificates

- As the Certifying Authority, the Supreme Court manages the public key infrastructure, which involves the use of private and public keys for digital signature and data encryption. The Certifying Authority will verify the application for a digital certificate from the applicant (the law firm and the court user) and issue a smart card. Applicants are then expected to run a Knowledge Management Software and generate the public and private keys. The public key is sent to the Certifying Authority for verification while the private key is written onto the smart card for the law firm. After the public key has been successfully verified, it is then written onto the smart card.

4a. What are the key formal elements, attributes and behaviour (if any) of the digital entities?

The elements of the digital entities are interpreted to comprise both the extrinsic and intrinsic elements of documentary form. The extrinsic elements are defined as the “material make up of the document and its external appearance,” while the intrinsic elements are the “integral components of its intellectual articulation.”

- Regarding the Court's Internal Workflow Application System, the key extrinsic and intrinsic elements are identified as follows:

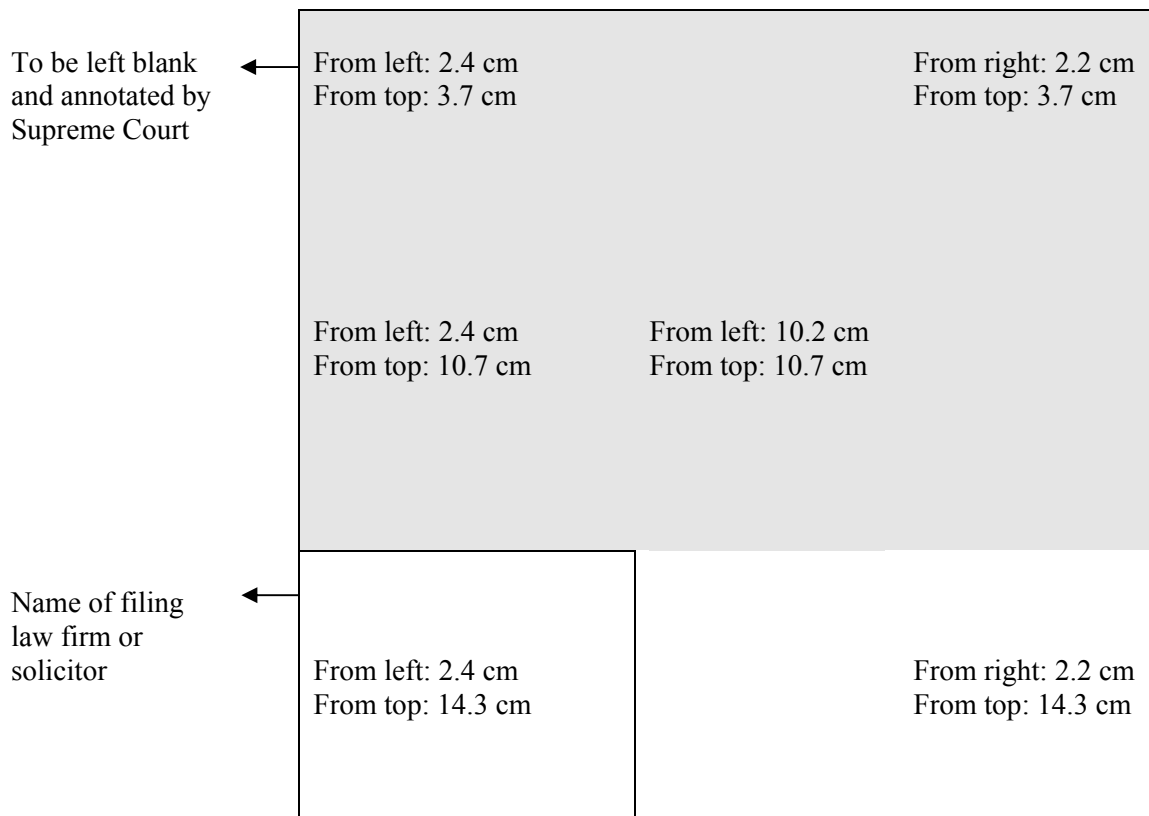
Extrinsic Elements

Physical Medium

The physical medium that carries the message in this case study is the Optical Disk, which stores the PDF records, and the Oracle database, which stores the record profile.

Format and Layout of the Record

The structure of the record and the manner in which the record is presented is specified under the Bankruptcy Rules (1995) and the various Practice Directions issued by the Court. For instance, the Practice Direction No. 7 of 2003 states that the records submitted to the Court must be converted into PDF, "using the Adobe Acrobat Exchange (Versions 3.01 and 4.0x) programme. It also specifies the alignment and formatting of court records like stating that the title of the record should appear at the "centre top of the page" and the phrase "IN THE HIGH COURT OF THE REPUBLIC OF SINGAPORE" must appear below the title of the record. An example of the schematic representation of the documentary form of the record as laid down by the Court is as follows:



Electronic Seal

The electronic seal of the record is affixed by the Courts' registry and then sent back to the respective law firm for follow-up action.

Annotations

The annotations made by the Court as part of the execution phase include the date and time of hearing, which is done by the registry staff, upon confirmation of a decision made by the Assistant Registrar or Registrar.

The annotations made by the Court as part of the management phase include the case number, document number system, date and time of filing. These are automatically generated by the system.

Intrinsic Elements

There are various types of records created in the EFS, which are closely associated with its procedural, juridical-administrative and documentary context. In the case of the eventual bankruptcy order endorsed by the Court, the protocol includes the title of the act, the name of the debtor and petitioning creditor while the subject would be the nature of the act, which is "bankruptcy order on creditor petition." The text would include details of the creditor, affidavits submitted to the Court by the creditor's solicitors and the debtor's particulars. The eschatocol would include the notice to the bankrupt and endorsement on order.

- Regarding digital certificates, the key elements and attributes include:
 - Certificate Control Number: the serial number of the certificate;
 - Certificate Issuer: the issuer name is left blank;
 - Certificate Owner Name: subject name of the certificate or name of lawyer;
 - Registered User Name: name of law firm;
 - Certificate Owner Mailbox: mailbox ID;
 - Certificate Owner NRIC: identity card number of certificate owner issued to citizens and permanent residents in Singapore;
 - Certificate Type: five types of certificates for Advocates and Solicitors, Judiciary Commissioner for oaths, Non Judiciary Commissioners, Service Bureau and Courts;
 - Reference Number: generated by the Certificate Authority Management System;
 - Effective Date: validity period of digital certificate; and
 - Expiry Date: validity period of digital certificate.

- Regarding behavior of the digital entities:

The records in the EFS mirror the paper-based system. Whenever a transaction is made between the law firm's front end module and the Court's system, as well as amongst other law firms who file court records to each

other, both parties are alerted of the existence of new records generated through their in-trays.

4b. What are the digital components of which they consist and their specifications?

At the Law Firms' Front End Module

- HTML pages displaying structured data;
- Adobe Acrobat version 4.0, 5.x and 6.0 (Standard). As of August 2003, records to be e-filed through the EFS must be saved in Acrobat 4 (PDF 1.3) format;
- HTML pages and PDF documents converted by the system into an XML file;
- Front-end software downloaded via the Internet; and
- Microsoft VM (Virtual machine) downloaded via the Internet.

At the Court's Internal Workflow Application System:

- Visual Basic; and
- FileNet document management system.

Creation of Digital Certificates

- The Public Key Infrastructure issues the public and private keys. During transmission, the sender will encrypt the session key with the receiver's public key. The receiver, upon receiving the data, will decrypt the session key using the receiver's private key.

4c. What is the relationship between the intellectual aspects and the technical component?

The type of operating system and the Web browser will affect the rendering and interaction of the digital entities, hence affecting the content, structure and context of the record. For instance, law firms have been advised to use Windows operating systems and to regularly update with the latest patches from Microsoft as the application system cannot run on other platforms such as Linux. The compatible Web browser to act on and view the records should be Internet Explorer 5 and above. The EFS moved progressively from a Windows (Electronic Data Interchange network) to the Web in July 2001 and, by the end of 2001, the migration was completed. The record profile is represented by the HTML pages with structured data fields while the court records are in PDF.

4d. How are the digital entities identified? (e.g., is there a [persistent] unique identifier)?

Law Firms' Front End Module

The file reference number assigned by the law firm to respective case files help to "uniquely identify a case file." There is also a case number, which is issued by the courts once the records have been accepted.

Court's Internal Workflow Application System

The unique identifier of bankruptcy case files is the case number, which is an automatic generated number assigned by the courts. The case file also includes the name of the petitioning creditor and the debtor.

Digital Certificates

The reference number of the digital certificates “uniquely identifies each smart card” and the certificate control number “uniquely identifies each certificate.” The certificate also includes the name of the certificate owner and the effective and expiry date of the certificate.

4e. In the organization of the digital entities, what kinds of aggregation levels exist, if any?

Data elements of the record profile are primarily in text while the supporting court records are in the PDF.

Law Firms' Front End Module

The front-end module is said to have a “case-centric” user interface. This means that law firms can check submissions to court, replies from court and hearing schedules based on a specific case.

Court's Internal Workflow Application System

The court cases are organized based on a system generated case number. The main case file are then divided onto various sub folders based on the type and nature of records filed such as affidavit, draft order, minute sheet and summon in chambers.

Digital Certificates

For a digital certificate to be issued to the solicitor, the solicitor must hold a valid practicing certificate and forward copy of his identification document and letter from his law firm to the Supreme Court Certification Authority. The validity for digital certificates kept by law firms is only three years and is expected to inform the Certification Authority if he no longer holds a valid practicing certificate.

4f. What determines the way in which the digital entities are organized?

The internal business processes and the juridical regulations laid down by the courts govern the organization of the digital entities of the EFS, which operates as a “fully electronic civil registry,” imbued with “electronic filing capability” and “electronic hearing capability.”

The EFS was one of the measures adopted by the Court to implement a more proactive management of cases and to clear the backlog of cases within the courts. The Supreme Court viewed the implementation of the EFS as pivotal to the “administration of justice, from the filing of court documents to legal research by counsel to the trial before the Judge” and “ensure greater efficiency and

effectiveness in the administration and dispensation of justice.” The other objective of the EFS is to facilitate transactions between the Supreme Court and the law firms. With the electronic filing service, law firms can file court records electronically using a Web-based interface. Using the electronic information service and electronic extract service, law firms can search for court records electronically and seek the Court’s approval for copies of the Court’s records. Lawyers can also apply for a renewal of their practicing certificates online and receive information on trials and hearings through short message service.

5. How are those digital entities created?

Law Firms’ Front End Module

Law firms are required to download Microsoft Virtual Machine and the front end Web client set up program that is available from the Internet and install it on their PC. By 2001, the EFS completed moving from a Windows to a Web interface. Each law firm has an account that is maintained by the Service Provider (CrimsonLogic) at its Data Centre. The front end module allows law firms to enter relevant metadata elements using a prescribed documentary template (in HTML), and to attach the corresponding supporting records, which are in PDF. The documentary template and the PDF records are then converted by the system into XML file. Besides creating and sending submissions to court, the system is able to keep track of submissions made to the Court and allows law firms to digitally sign records before submitting them to the courts.

Court’s Workflow Application System

The software of the Court’s application system is Visual Basic and the database used is Oracle. The application system allows the records to be routed to the appropriate registry staff and for internal approval within the Court, generate statistics and to query for information. The Court uses Filenet, a document management system that indexes and stores the PDF files sent by the law firms.

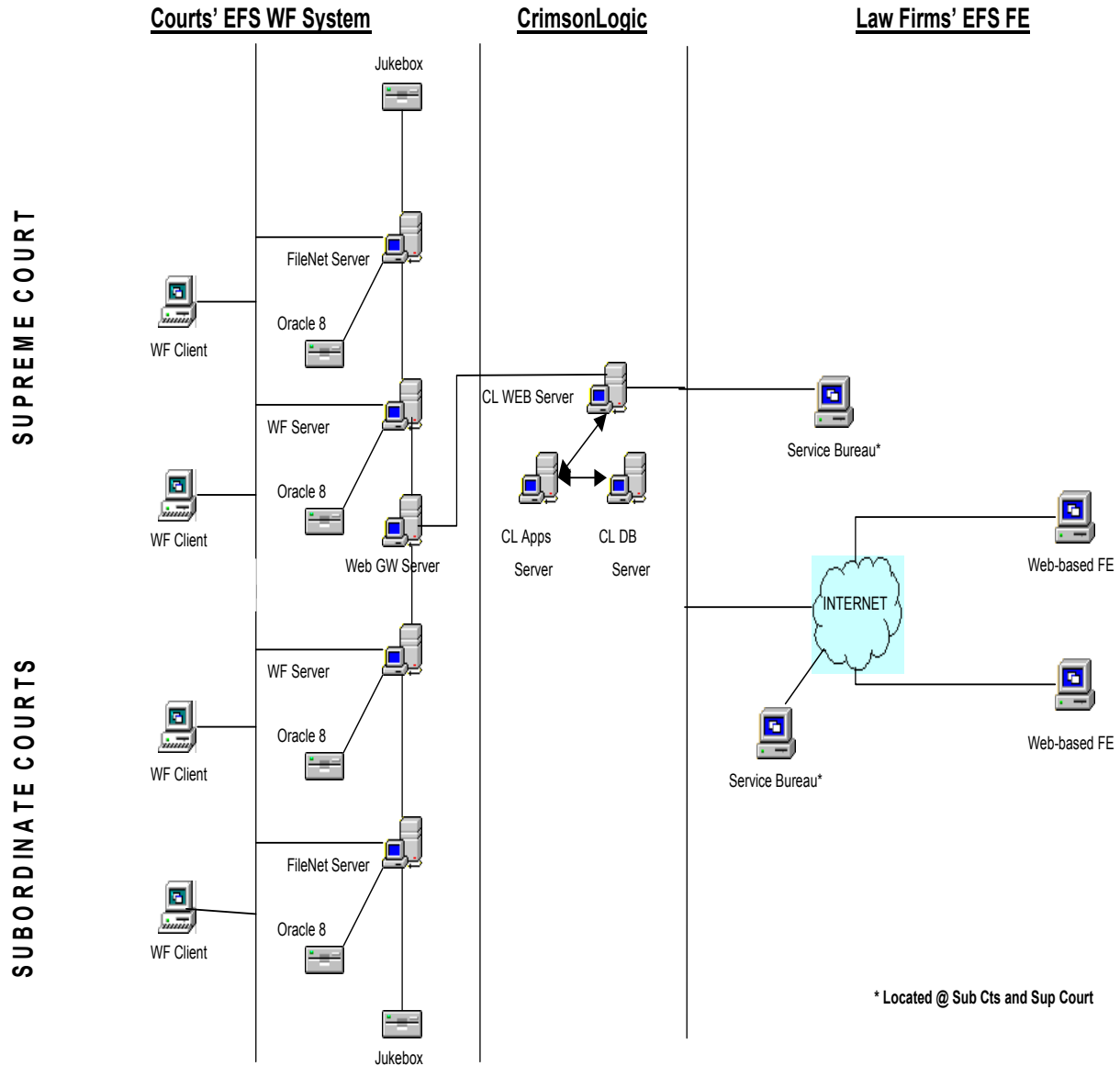
Digital Certificates

Law firms are required to obtain a smart card from the Certifying Authority (i.e., Supreme Court) before using Web-based key generation software to generate a public and private key pair. The Certifying Authority will certify the law firms’ public key.

5a. What is the nature of the system(s) with which they are created? (e.g., functionality, software, hardware, peripherals etc)

A schematic representation of the system is provided in the diagram on the next page.

EFS - CONCEPTUAL ARCHITECTURE



Details of the hardware and software used are as follows:

Item	Description
Courts' Workflow Servers	Index Server
	OSAR Server
	Jukebox
	Prefetch server
	NT Splitters – 4 units for each Court.
	Fax Server
RDBMS	Oracle 8.0.6
Document Management System	Filenet 3.5.0 SP2 (Panagon Workflow and IDM 3.5.0)
Courts' Workflow Client software	Developed using Visual Basic
Text Search Server	Windows NT Server running search engine - DTSearch
Document Format	PDF
Key Management System	Certificate Authority Management System: PC based peer-to-peer network comprising 1 master and 3 slave PCs. Certificate Server: IBM AIX server Network Station: Win 95 based PC Certificate Client System /Key Generating Software: Runs on Win 95/98 based PC at LF
CrimsonLogic Servers	Web Server – Sun Server
	Application Server – Sun Server
	Database Server – Sun Server
Front End Application	Developed using Java, XML
Front end client at Law Firms	Browser based. Software downloaded from the EFS Web portal.

5b. Does the system manage the complete range of digital entities created in the identified activity or activities for the organization (or part of it) in which they operate?

The Court's application system manages all incoming submissions by the law firms as well as outgoing replies by the Court. The jukebox stores and maintains the PDF records submitted by the law firm while the information on the documentary template that is entered by the law firms and subsequently added by the Court is stored in an Oracle database.

6. From what precise process(es) or procedure(s), or part thereof do the digital entities result?

The law firm is expected to enter information on their cases through a prescribed documentary template in the EFS. Some of the metadata elements are fixed as there is a pull down menu for law firms to select. Some of the metadata elements the law firm has to enter include the firm's file reference number and party details, which includes the party type (i.e., whether the firm is representing the creditor or debtor), the name of the parties, address of the parties and the name of the solicitor. The court records must be in PDF using either Adobe Acrobat Exchange Version 3.01 or 4. According to the Practice Direction No. 1 of 2005, the law firms must abide to certain limits when filing records. For instance, the total number of records in one submission cannot exceed 99 and the "size of a single transmission cannot exceed 500 megabytes."

On the part of the Court, the registry staff is expected to check the information entered by the law firms and sent the acknowledgment back to the law firms. As the EFS captures both the metadata of the record and the actual record itself, the Court must check both the metadata and the record. For example, when processing the bankruptcy petition, the registry staff needs to conduct a number of verification checks, which include the following:

- Record must be dated and signed by law firm of the petitioning creditor
- Check the details of the parties
- Check the actual business process and its accompanying documentary forms against the various juridical regulations like whether the petition is filed within four months of the date the statutory demand was served and that the debtor owes a sum of \$10,000 and above
- Check that the court fees are paid

Once the registry staff completes the validation check, the record are then annotated, affixed with the Court's seal and the signature of the duty Registrar and then sent back to the law firm via the EFS.

7. To what other digital or non-digital entities are they connected in either a conceptual or a technical connection way? Is such connection documented or captured?

The EFS operates as an electronic recordkeeping system. The following entities are connected in both a conceptual and a technical manner:

Creation of a Bankruptcy Case Files by Law Firms and Preparation of Submission to Court

The law firm must enter a prescribed set of information based on a documentary template, including:

- The firm's file reference number, which is unique;
- The court type (selected via a pull down menu);
- The name of the case file;
- The date the case was first created;
- Party details (for example, whether the law firm is filing on behalf of the petitioning creditor or debtor, name of the party, party ID, address and name of solicitor).

It then attaches supporting case file records in PDF format.

Processing of Case Files by Supreme Court

This involves:

- Performing a series of validation checks such as: determining whether the record is submitted in the right format, ensuring that the record is dated and signed, checking the party details by comparing both the PDF record and the template, and confirming that court fees are paid;
- Ensuring that the record is submitted within a specific time frame as laid down by the *Bankruptcy Act*, Bankruptcy Rules and Rules of Court;
- Preparation of hearing lists, which is done via the EFS, and entering the results of hearing into the system; and
- Checking to see that hearing results are accurate before faxing them to the Official Assignee.

8. What are the documentary and technological processes or procedures that the creator follows to identify, retrieve and access the digital entities?

The creator in question is the Supreme Court. The creator is able to identify, retrieve and access the case files from the EFS in-tray through the case number, the name of the petitioning creditor and debtor. The workflow of the EFS is based on the internal work processes and the juridical regulations of the Court.

9. Are those processes and procedures documented? How? In what form?

The internal work process of the Court in processing bankruptcy cases is governed by the following:

- *Bankruptcy Act*, 1995, which relates to the “law of bankruptcy and matters connected therewith and to repeal the Bankruptcy Act.”
- *Bankruptcy Act (Commencement) Notification*, 1995 also known as the Bankruptcy Rules, which states the various court procedures, the procedures involved in bankruptcy such as service and hearing of creditor’s petition, including the various documentary forms that needed to be submitted to court such as the statutory demand and the creditor’s bankruptcy petition.
- Internal flow chart for processing of bankruptcy petitions for creditors and debtors as well as summons in chambers drawn up by the Legal Directorate

Besides the above, the Supreme Court also regularly issues user guides online for law firms and updates on the latest developments on their front end module.

The generation of the public and private key set and the management of the smart card using a Web-based certificate client system is documented in the user guides.

10. What measures does the creator take to ensure the quality, reliability and authenticity of the digital entities and their documentation?

Quality

One of the Court's core values is to deliver quality public service. The Court "adopts a customer-focused approach" and stresses "accessibility, quality and the timely deliverance of services." Due to this particular value proposition subscribed by the Court, it regularly seeks feedback from legal firms to enhance the system. An example to illustrate how the Court took efforts to improve the quality of the system is the establishment of the EFS Review Committee appointed by the Chief Justice in 2003. The committee comprised of representatives from the Singapore Academy of Law, the judiciary and from legal firms. A survey of 136 law practices out of a total of 776 showed that 65% of practices spent more time in preparing and filing records for the EFS. Eighty-five percent (85%) of practices said that the operational costs of their firms have increased with the introduction of the EFS, while 86% said that the cost of litigation for their clients has increased. As a result of this survey and feedback from law firms, the Review Committee recommended that e-filing fees be reduced by 20%, except for fees for law firms to serve papers to another firm. The 15% surcharge imposed by service bureaus for filing of records was also removed and penalty charges for filings rejected by the system will either be waived or capped at SING\$25. The committee observed that the benefits of the system "need to be balanced against the additional costs and processing time required for filing" and that there is a need to resolve "technical latency and system instability problems" Consequently, the committee recommended that the service provider educate law firms "on the best practices for preparing and filing court submissions," to redesign a more user friendly front end interface and to conduct an "exhaustive technical audit" so as to pin-point the reasons behind the "latency and instability of the system."

The recommendations put forth by the committee were accepted and one outcome was the development of an enhanced feature of the EFS front end module, which allowed for better case management. One interviewee of this case study commented that "the EFS is constantly developing," which is a reflection of the Court's efforts to incorporate comments from its customers to develop better features for the EFS. Another interviewee states, "There is a constant review and improvement of the EFS to ensure that it caters to the constant needs of the Bench, the Bar and the litigants. The review of technical and usability issues are a constant process to ensure that the system stays ahead of its time in providing the Singapore civil litigation system with a reliable and efficient system for the exchange and archiving of court documents."

The creator also makes an attempt to improve the quality of its services by working closely with the Singapore Academy of Law and the service provider to conduct courses to the law firms on how to utilize added features or enhancements of the EFS.

Reliability

Reliability is defined by InterPARES as “The trustworthiness of a record as a statement of fact. It exists when a record can stand for the fact it is about, and is established by examining the completeness of the record's form and the amount of control exercised on the process of its creation.”¹

In the context of this case study, the completeness of the record form, including its file format, is prescribed by the juridical regulations. The various juridical regulations such as the Practice Directions specify the file format and documentary form of the records. For instance, Practice Direction No. 8 of 2000 was one of the legal regulations that provided the basis for the compulsory filing of records through the EFS. In addition, Practice Direction No. 7 of 2003 states that “every single page of a specified document must be paginated so that the pagination on the actual document (which is subsequently converted to PDF) corresponds with the pagination of the specified document in the electronic case file.” In cases where a signature is required, “it will be sufficient to affix, electronically or otherwise, an image of the manual signature of the solicitor or law firm concerned.” The Practice Direction also states the information that is annotated by the Court, which includes “the case number or document number, the date and time of filing, the date and time of any hearing, an image of the signature of the Registrar, and an image of the seal of the Supreme Court.”

There are strict procedural controls in the creation of records on the part of the courts as the registry clerk will check the information entered onto the documentary template, which acts as the record profile against the court records that are in PDF. If the information entered by the law firm is inaccurate then the registry staff will reject the record and the law firm is required to re-file their submissions. Once the records are filed and information is entered onto the documentary template by the law firms, the Court cannot amend the information, hence protecting the integrity of the record. In cases where there are errors on the part of the Court in accepting or rejecting the records submitted by law firms, such errors cannot be overwritten by the registry staff and approval from Director/Computer Information Systems Department is required.

Authenticity

Authenticity is defined as the “trustworthiness of a record as a record” and is dependent on the state, mode and form of transmission and manner of preservation and custody.

The record creator’s authenticity and authority are ensured through the provision of an access control matrix, which identifies the names and various roles of the action officers as well as their access rights. Furthermore, EFS rights are dependent on the role or competency of the action officers and are not solely dependent on seniority or designation. For instance, the System Administrators of the EFS are not involved in the operations of the system, hence preventing any potential conflict of interest.

¹ InterPARES 2 Terminology Database. Available at http://www.interpares.org/ip2/ip2_terminology_db.cfm.

The InterPARES 1 Authenticity Task Force Report states that “the authenticity of electronic records is threatened whenever the records are transmitted across *space* (i.e., when sent between persons, systems or applications) or *time* (i.e., either when they are stored offline, or when the hardware or software used to process, communicate, or maintain them is upgraded or replaced).”² The replies from the respondents of this case study suggest that there is an emphasis placed on ensuring the secure transmission of records vis-à-vis that of the law firm’s front end system and the Court’s internal application. Law firms are encouraged to implement certain technical measures to ensure the authenticity of their digital entities. For instance, a law firm can choose to encrypt its records before sending them electronically to the courts using the firm’s smart card. However, even if the law firm does not encrypt its submissions, the provision of secure sockets layers provides a secure transmission of records between the law firm and the EFS Service Provider server. The secure transmission of records between the Service Provider server and the Courts is ensured through the installation of hardware encryptors. Moreover, there are a number of stringent security procedures to “prevent security breaches, protect customer data and detect any security incidents.” There are also a number of protective countermeasures in place, such as the use of firewall, anti-virus and intrusion-detection systems, designed to protect the integrity of the system and its records.

11. Does the creator think that the authenticity of his digital entities is assured, and if so, why?

In the legal context, authenticity means that the Courts “have to ensure that a particular piece of document or evidence that is produced at the hearing is what it is claimed to be.” In the words of one case study respondent, the records have to be authentic so that the “courts are given the best evidence in order to render a decision on the case. If a particular piece of evidence is not authentic (e.g., has been tampered with), then that document is likely to be given less weight by the Judge/Juridical Officer if the claims of tampering and/or fraud are found to be true.”

The creator has instituted a number of measures to ensure the authenticity of the digital entities in the EFS. They are as follows:

- Periodic Scan to Check Vulnerabilities in the EFS Website

The EFS is periodically subjected to intentional hacking by the InfoComm Development Authority of Singapore (IDA), a government agency, to highlight any vulnerabilities with the system. To date, the results indicate that there are no vulnerabilities.

² Heather MacNeil et al., “Part One – Establishing and Maintaining Trust in Electronic Records: Authenticity Task Force Report,” in *The Long-term Preservation of Authentic Electronic Records: Findings of the InterPARES Project*, Luciana Duranti, ed. (San Miniato, Italy: Archilab, 2005), 21. PDF version available at http://www.interpares.org/book/interpares_book_d_part1.pdf.

- Implementation of Public Key Infrastructure (PKI)

The creator believes that the use of authentication technologies, which in this case study involves the use of the PKI digital certificate mechanism, helps to “ensure the integrity and authenticity of the message.” All filing of records by the law firms can only be made if the user is registered and obtains a smart card from the Certification Authority, which allows the user to digitally sign the records.

12. How does the creator use the digital entities under examination?

The creator utilizes the EFS as part of its overall mission and mandate to “superintend the administration of justice” and is in line with the government’s efforts to promote e-government services. The use of e-litigation services also enable the Courts to serve their customers better as court records can be submitted for filing beyond office hours. The effective management of cases allows the Court to “keep track of the progress of cases and supplies information to the litigation module of LawNet, which is Singapore’s national legal information database.” Furthermore, the records in the EFS help the Courts to provide information services to the public. In the case of bankruptcy cases, the records would enable the public to make an informed decision before entering with a business arrangement with an individual or an organization by assessing their credit worthiness.

The use of digital certificates in the EFS “ensures data integrity, confidentiality, authentication and non-repudiation,” as the Court is able to check for any possible tampering of records.

13. How are changes to the digital entities made and recorded?

As mentioned in question 11, information entered by the law firms cannot be changed by the Court. The Court is also required to seek approval from Director/Computer Information System Department to update the back end system should there be any errors in approving or rejecting records filed by law firms. The EFS maintains audit logs that keep track of all transactions. The transaction log maintains all changes to the digital entities in the system such as changes to documentary templates, and deletion of records and annotations. The financial audit log also maintains changes made to the payment of fees made to the Court while the violation log keep all changes to the digital entities in the system such as changes to templates and deletion of documents. The violation log keeps track of unsuccessful attempts to use functions.

14. Do external users have access to the digital entities in question? Is so, how, and what kind of users do they make of the entities?

External users are defined as staff outside of the Insolvency Section under the Legal Directorate and law firms. Access rights to users within the Court are based on their specific job roles and competencies. Law firms can use the index search to identify a particular electronic case file. Should they wish to view extracts of the records, law firms have to file the praecipe using the EFS to seek approval from the Court to obtain an extract. Once approval has been given, the soft copy of the extract will be transmitted electronically to the law firm concerned.

15. Are there specific job competencies (or responsibilities) with respect to the creation, maintenance and use of the digital entities? If yes, what are they?

The Court registries handle records of civil and criminal cases including writs of summons, bankruptcy and powers of attorney. In the case of the Insolvency Section, registry staff are in charge of both bankruptcy and companies winding up proceedings. With regard to bankruptcy proceedings, the job competencies are as follows:

- Processing of court records relating to bankruptcy such as bankruptcy petition, originating summon bankruptcy, checking of draft order of court and engross orders and verifying gazettes of orders.
- Preparing hearing lists of bankruptcy cases through the EFS
- Updating of hearing outcomes onto the EFS

There is also an Information Office that provides IT support and plans the overall strategy and direction of IT related matters in the Court. IT staff have to understand the business requirements of the Court but also are expected to have project management and administrative skills, as well as technological skills like programming skills on specific hardware and software environment and systems analysis and design skills.

16. Are the access right (to objects and/or systems) connected to the job competence of the responsible person? If yes, what are they?

Yes. As mentioned in the answer to question 11, access rights are accorded based on the various roles or job competency of the person. At the same time, filing to the EFS can only be done with registered EFS users who must obtain a smart card from the Supreme Court who is the Certifying Authority. The process of issuing a smart card requires physical verification of the identity of the person at the time of application.

17. Among its digital entities, which ones does the creator consider to be records and why?

The creator considers both the documentary template and the PDF documents submitted by the law firm as records. The documentary template operates as a record profile and is entered by the law firm filing the record. The fields of the documentary template are controlled to ensure consistency and accuracy of information and this explains why there is a drop down menu for some of the data elements. The Supreme Court considers the documentary template as records as there is an effort on the part of the Court to ensure that the information entered into the documentary template by the law firm matches the information that is in the PDF document. Should the information entered in the documentary template is inaccurate, the submission would be rejected by the Court and the law firm is asked to re-file the submission as the Court cannot amend the elements in the record profile that is entered by the law firm.

The PDF record is considered a record by the creator as it bears the signature of both the Court and the law firm as well as the Supreme Court's seal. They also include the date and time of the hearing. Furthermore, the Court specifies strict control on the form of the record for it to be admissible in a court of law. For example, Practice Direction 7 of 2003 states that

“bankruptcy proceedings shall be filed using white-coloured paper regardless of whether the specified documents are filed, served, delivered or otherwise conveyed by electronic transmission or via the service bureau.”

18. Does the creator keep the digital entities that are currently being examined? That is, are these digital entities part of a recordkeeping system? If so, what are its features?

Digital certificates are valid for a three-year period after the date of its issue. They are used for the transmission of records and are not an integral component of the records as their primary purpose is to identify the filing party. For instance, the smart card, which is embedded with the digital certificate, is used whenever the law firm files a submission to the Courts and whenever the law firm opens and views the replies from the Courts. In this sense, the digital certificates are used during the active lifecycle of the record and not when the record becomes inactive.

Both the PDF record and the documentary template are the digital entities that constitute part of the recordkeeping system. Once the submission by the law firm is accepted by the Supreme Court, the documentary template is stored in the Oracle database whereas the PDF records are stored onto Optical Disks in a jukebox. The optical disks are Write Once, Read Many Times (WORM) to ensure that information stored in the optical disks is not alterable.

18a. Do the recordkeeping system(s) (or processes) routinely capture all digital entities within the scope of the activity it covers?

[Not addressed.]

18b. From what applications do the recordkeeping system(s) inherit or capture the digital entities and the related metadata (e.g., e-mail, tracking systems, workflow systems, office systems, databases, etc.)?

The EFS captures digital entities from the Oracle database, Filenet (document management system), jukebox and visual basic software. Answer to question 5a has the detailed list of the application systems.

18c. Are the digital entities organized in a way that reflects the creation processes? What is the schema, if any, for organizing the digital entities?

The Court’s internal application systems are organized based on the type of case file.

18d. Does the recordkeeping system provide ready access to all relevant digital entities and related metadata?

Authorized court users can view both the record profile and the PDF record. Specified group of users can, based on their job competency, view certain categories of audit logs. For instance, the violation log is monitored closely by the System Administrator while the financial audit log is monitored by Finance Section

staff. Systems logs are monitored by the Facilities Management team who will alert the Computer Information Systems Department in the event of an abnormal activity.

18e. Does the recordkeeping system document all actions/transactions that take place in the system re: the digital entities? If so, what are the metadata captured?

All actions and transactions are documented in the audit trails. They are as follows:

- Transaction Log
Records user ID of user who activates the change, function name, date./time of the change, data items before and after the change
- Financial Audit Log
Records user ID, function name, date/time of the action, case number/document, control number/unique reference number, amount of fees before the change, amount of fees after the change, remarks, approval for exemption/waiver of court filing fees, approval for request of waiver of hearing fees, and approval for refund of hearing fees.
- Violation Log
Records user ID of user who attempts to access functions he or she is not granted access to, unsuccessful log in attempts, function name, date/time of the action, and brief description of the nature of the violation.

19. How does the creator maintain its digital entities through technological change?

Digital Certificates

Digital certificates are valid for a three year period and have to be reissued again. Recently, the certificate authority servers were upgraded from Windows 95 to Windows XP.

Courts' Internal Workflow Application System

The PDF records are stored in optical disk in a jukebox while the documentary templates are stored in an Oracle database. There is both a daily and weekly backup of data, which are kept in an off-site location to ensure the full restoration of data in the event that the system fails. For example, every time a record is filed by the law firm, the records are stored on three disks. One disk is stored permanently in the jukebox to facilitate online access to information. The second disk is taken to an off-site storage at the end of the week and the third disk is sent off-site once the disk is full.

19a. What preservation strategies and/or methods are implemented and how?

The Court preserves its digital entities by migrating the technology deployed onto a newer platform. For example, the Court has changed the storage media for both the jukeboxes and backup tapes due to technology obsolescence.

In the words of an interviewee, the Court's strategy is "to be able to foresee new standards/technology before the current technology that has been deployed becomes fully obsolete, so that it provides us with sufficient time to migrate to the new technology/standards without loss of data. This way, we hope to be able to preserve the old data even in the dynamically changing technological environment that we are in." The Supreme Court has also considered other options such as outsourcing the Certification Authority function so that the Court can be "insulated from managing technology obsolescence." However, this option is still in its preliminary stage and other options will be considered during the implementation of the next version of the EFS.

19b. Are these strategies or methods determined by the type of digital entities (in a technical sense) or by other criteria? If the latter, what criteria?

The preservation strategies are dependent mainly on technical factors. An interviewee commented that technology upgrades are part and parcel of the EFS.

20. To what extent do policies, procedures, and standards currently control records creation, maintenance, preservation and use in the context of the creator's activity? Do these policies, procedures, and standards need to be modified or augmented?

The rules of court, *Bankruptcy Act* and the Practice Directions control the creation and maintenance of the records. There is an acknowledgement that the records must be accessible so that banks, financial institutions and other members of the public can use the bankruptcy records to assess the creditworthiness of parties. An internal report by the Court specifies that the "Supreme Court has a duty to maintain court records. Such records may be inspected by parties with valid reasons to do so."

In a 1996 report on the management of court records, the Court categorizes its various types of case records into essential and non-essential records categories. Non-essential bankruptcy records are those records in which no bankruptcy petition is issued. Such records are to be kept for a one-year period. Essential records for bankruptcy cases are those records where receiving and adjudication orders are not made rescinded or annulled. The report also recommended that microfilms be "selected as the media for the permanent storage of court records," especially for inactive records. The report showed that the creating agency and the archives have been working closely with each other in terms of the disposal of their case files. However, with the implementation of the EFS, it will be good to undertake the various preservation options for the long terms long-term preservation and accessibility of court records. Besides migrating its active and semi-active records, the Courts can consider outputting inactive digital records onto microfilm.

21. What legal, moral (e.g., control over artistic expression) or ethical obligations, concerns or issues exist regarding the creation, maintenance, preservation and use of the records in the context of the creator's activity?

- *Electronic Transaction Act*
- Practice Directions
- Rules of Court

Although there is no privacy law in Singapore, the courts ensure strict control over access and use of its records as they contain confidential information on the parties. At the same time, the Court is conscious of its role as an information service provider as such information can be used not only to assess creditworthiness of individuals but can be used as legal precedents. Consequently, law firms who wish to consult the case files kept by the Courts have to seek prior approval before they are granted access.

22. What descriptive or other metadata schema or standards are currently being used in the creation, maintenance, use and preservation of the recordkeeping system or environment being studied?

The schemas for the documentary templates of the EFS are based on the workflow and juridical requirements of the Court. An example of the metadata schema for the court workflow application system is provided in the screen capture image on next page (with personal information blanked out).

23. What is the source of these descriptive or other metadata schema or standards (institutional convention, professional body, international standard, individual practice, etc.)?

This is based on institutional practice. The metadata used in the documentary template are based on common data elements associated with the court records that have to be converted into PDF.

The screenshot shows the 'EFS - Case File' application window. At the top is a menu bar with 'File', 'Document', 'Hearing', 'Work Item', 'Others', 'View', and 'Help'. Below the menu is a toolbar with various icons for file operations. The main area is divided into several sections:

- Case Information:** Fields for 'Case No', '1st Petitioning Creditor', and '1st Debtor' are present, with some text redacted by blue bars.
- Case Status:** Displays 'Case Status : Concluded' and 'Bankruptcy Status : Bankruptcy Order'.
- Folder Tree:** A tree view under 'Main Case' shows folders: 'B1/2005', 'Other Folders', 'Confidential Minute Sheet', 'Draft Order/Judgment', 'ORDER', and 'SIC'.
- Buttons:** On the right side, there are buttons for 'Case Summary', 'Case Info', 'Document Info', 'Text Search', and 'View Message'. There are also checkboxes for 'Sensitive' and 'High Profile'.
- Document List Table:** A table at the bottom lists documents with columns for 'Doc Name', 'Doc No', 'Originator/JO na...', and 'Filed/Indexed/Order...'. The table contains 20 rows of data.
- Status Bar:** At the very bottom, it shows 'Ready', the time '3:10 PM', the date '01/08/2005', and several function keys: 'CAPS', 'NUM', 'INS', and 'SCRL'.

Doc Name	Doc No	Originator/JO na...	Filed/Indexed/Order...
Affidavit Of Truth Of Statements			03/01/2005 10:39:19
Authority (Bankruptcy)			03/01/2005 10:39:19
Creditor's Bankruptcy Petition			03/01/2005 10:39:19
Lodgment Form (Bankruptcy)			03/01/2005 10:39:19
Letters			06/01/2005 14:53:21
Letters			07/01/2005 09:45:51
Affidavit (Bankruptcy)			13/01/2005 17:22:55
Summons In Chambers (Others)	SIC208/2005		13/01/2005 17:22:55
Order Made In Chambers (Bankru...	ORC300/2005		17/01/2005 18:44:04
Order Made In Chambers (Bankru...			17/01/2005 17:16:07
Bankruptcy Checklist			11/02/2005 09:11:25
Affidavit (Bankruptcy)			16/02/2005 17:17:01
Affidavit Of Non-Satisfaction Of D...			16/02/2005 17:17:01
Minute Sheet			18/02/2005
Affidavit Of Non-Satisfaction Of D...			31/03/2005 10:46:55
Minute Sheet			01/04/2005
Minute Sheet			08/04/2005
Affidavit Of Non-Satisfaction Of D...			14/04/2005 16:18:30
Bankruptcy Order			18/04/2005 12:48:16
Bankruptcy Order	BO1132/2005		18/04/2005 16:27:02
Gazette Notification			09/05/2005 17:14:27
Statement Of Affairs			21/07/2005 11:30:09

E. Narrative Answers to Applicable Domain and Cross-Domain Questions

Domain 1 Research Questions

1.1a. What type of documents are traditionally made or received and set aside (that is, created) in the course of artistic, scientific and government activities that are expected to be carried out online?

The EFS is a form of e-government service that allows “lawyers to file all court documents electronically over the Internet via the Web-based front end system.” The case study identified three types of electronic records that are created by the EFS: law firm’s front end system, digital certificates and the Court’s internal application system, which is also manifested in the form of PDF documents, HTML Web pages, XML, Oracle and FileNet databases.

1.1b. For what purpose?

In accordance with the legislative requirements of Singapore, the EFS was implemented on 11 Dec 2000, and, according to Practice Direction No. 8 of 2000, “any proceedings or applications under the Bankruptcy Act or Bankruptcy Rules filed on or after 28 May 2002” must be “filed, served and delivered through the EFS.”

1.1c. What types of electronic documents are currently being created to accomplish those activities?

Digital certificates, databases (Oracle and FileNet), PDF files.

1.2a. What are the nature and characteristics of the traditional process of document creation in each activity.

The workflow of the EFS parallels with the traditional paper environment since it is regulated by the various legislations of the Court. The use of PKI helps to ensure data integrity and confidentiality of information.

1.2b. Have they been altered by the use of the digital technology, and if yes, how?

Law firms are required to enter information under prescribed documentary template in the EFS before submitting it to the courts, which was previously not practiced under the paper environment.

1.3a. What are the formal elements and attributes of the documents generated by these processes in both a traditional and a digital environment?

The use of digital signatures, annotations and electronic seal in the EFS closely parallel that with the paper environment. The only difference is the use of PKI infrastructure and the payment mode for direct debit transactions.

1.3b. What is the function of each element and the significance of each attribute?

The function of each element is dependent on the workflow and the legislative requirements of the Court.

1.3c. Specifically, what is the manifestation of authorship in the records of each activity and its implications for the exercise of intellectual property rights and the attribution of responsibilities?

Authorship here refers to the Supreme Court. Since the documentary template is entered the law firm and subsequently checked by the Court, there is an attempt to delegate responsibility to the different parties.

1.4a. Does the definition of a record adopted by InterPARES 1 apply to all or part of the documents generated by these processes?

The definition of a record adopted by InterPARES is applicable to the completed documentary template and the PDF court records. The notion of fixity of records is also applicable to this case study as the documentary template and PDF records are put aside in the form of the Oracle database and the optical disks so that the records can be referred to and acted upon for action. In fact, the definition of a record under the *Electronic Transactions Act* (1998) also suggests on this notion of fixity. A record is defined as “information that is inscribed, stored or otherwise fixed on a tangible medium or that is stored in an electronic or other medium and is retrievable in perceivable form.”

1.4b. If yes, given the different manifestations of the record’s nature in such documents, how do we recognize and demonstrate the necessary components that the definition identifies?

Although there are some commonalities between the records generated at the paper and the electronic environment such as the formal elements manifested in the court records, the use of PKI provides a secure channel for transmission of information through the EFS. The components of the PKI include the Certification Authority, Registration Authorities, digital certificates, certificate holders and security policies.

1.5. As government and business deliver services electronically and enter into transactions based on more dynamic Web-based presentations and exchanges of information, are they neglecting to capture adequate documentary evidence of the occurrence of these transactions?

In the case of the Supreme Court, the creation of records is closely intertwined with the rules and legislations of the Court. There are strict procedural controls in the creation and modification of records.

1.6. Is the move to more dynamic and open-ended exchanges of information blurring the responsibilities and altering the legal liabilities of the participants in electronic transactions?

This is currently not the case. Both law firms and courts have a responsibility and interest in ensuring the accuracy, reliability and authenticity of records to fulfill their mandated functions. There is a conscious need to promote accessibility of information within a reliable and secure network and procedures are in place with regard to access to records that are based on the roles and job competencies of the persons concerned.

1.7a. How do the record creators traditionally determine the retention of their records and implement this determination in the context of each activity?

The retention of records is jointly decided by both the record creator and the National Archives. The retention period for various case files was set before the implementation of the EFS. The Court recognizes that there is a need to address the long-term preservation of electronic records, although there is currently no strategy in place because the Court views the system to be fairly current.

1.7b. How do record retention decisions and practices differ for individual and institutional creators

Since the documentary template and the PDF court record are immediately saved onto the Oracle database and the optical disk after an action is taken, there is no difference in the retention practices between the individual and institutional creators.

1.7c. How has the use of digital technology affected their decisions and practices?

One of the push factors for the implementation of the EFS was to solve the storage of paper records. At the same time, the Court is conscious that despite the availability of digital storage space, “it may be more cost effective and efficient to impose stricter retention guidelines with appropriate checks and balances embedded in the work flow to ensure that documents are deleted as soon as they cease to have value, and that only those that require long term storage are retained in an online or offline environment.”

Domain 2 Research Questions:**2.1a. What does record reliability mean in the context of artistic, scientific and government activities?**

Record reliability in the case of the EFS means ensuring the court records support in the judicial making process and for future reference. An interviewee states that “from a judicial administration perspective, reliability is key to the Supreme Court’s ability to process the numerous submissions from the lawyers and the litigants each day while maximizing our available human resources. Reliability also requires a system that reduces the occurrences of files going missing.”

2.1b. To what extent can the electronic records created in the course of each type of activity be considered reliable and why?

The records within the EFS are considered reliable as they are created and modified in a controlled environment with access privileges assigned to respective action officers based on their job responsibilities. To the creator, the records are reliable as the EFS maintains a complete case file with all records filed by the parties stored in a central system.

2.1c. What requirements on their form and controls on their creation would make us presume that they are reliable?

Besides the creation of an access control matrix, the EFS does not allow records filed by the law firm to be changed and modified by the Court. Records once filed are written onto the optical disk and any errors in the acceptance or rejection of submissions of records by the law firms require prior approval from Director/Computer Information Systems Department.

2.2a. What does record accuracy mean in the context of each activity?

InterPARES defines accuracy as “the degree to which data, information, documents or records are precise, correct, truthful, free of error or distortion, or pertinent to the matter.”

Accuracy in the context of the EFS means the provision of accurate information from the case records as this will impact on the decision made by the judicial officer. In terms of the creator’s viewpoint, “accuracy of data results in effective management of case load as well as the production of statistics” for monitoring purposes. The Supreme Court’s Guidelines in the Selection and Management of Information states that information must be “sufficiently accurate for its purposes, comprehensive enough for its purposes” and “from a reliable source in which the user of the information has confidence.”

2.2b. To what extent can the electronic records created in the course of each type of activity be considered accurate and why?

There are various checks and balances to ensure that the electronic records in the EFS are accurate. For instance, the keying of parties’ information is done by the law firms as they would be in a best position to know the details of their clients. The registry staff will also take steps to check and ensure that information entered into the documentary template matches that with the records that are in the PDF. If the information entered by the law firm is inaccurate, the submission is rejected and the law firm is required to re-file again. In the case of bankruptcy records, judicial officers are required to “personally verify the accuracy of the hearing results of bankruptcy proceedings before such information is released to the Insolvency and Public Trustee’s Office.”

2.2c. What controls on their creation would make us presume that these records are accurate?

Only authorized law firms and court users can create and access records in the EFS, which provides a system of checks and balances to ensure that accurate information is entered into the EFS.

2.3a. What does authenticity mean in the context of each activity?

In the legal context, the Courts have to ensure that a particular piece of evidence produced at a hearing is what it is claimed to be. Court records have to be authentic so that the “courts are given the best evidence in order to render a decision on the case. If a particular piece of evidence is not authentic (e.g., has been tampered with), that document is likely to be given less weight by the judge/judicial officer of the claims of tampering and/or fraud are found to be true.”

2.3b. To what extent is the definition of record authenticity adopted by InterPARES I relevant to the records resulting from each type of activity and from the use of increasingly complex digital technology?

The identity of each record is maintained as all related records specific to a specific case are filed together in a case file, hence establishing an archival bond. The integrity of the records are also ensured by the implementation of a variety of security and control mechanisms such as the implementation of PKI infrastructure, use of digital certificates and the installation of protection and detection systems to protect the application system.

2.4a. On what basis can the records created in the course of each activity be presumed authentic?

The creator presumes that the records are authentic based on the implementation of various authentication technologies. There seems to be greater emphasis placed on ensuring the authenticity of records across space rather than on preserving authentic copies of electronic records over time. Although the system is five years old, there is a need to explore a long-term preservation strategy to preserve the ability to reproduce authentic copies of electronic records, apart from storing them in optical disks (for PDF files) and in an Oracle database (for documentary templates).

2.5a. How is the authenticity of these records affected by their transmission across space and time?

The use of PKI and security controls ensures that filings to the EFS are made by registered users and help to prevent any alteration and tampering of information. Although only legal practitioners with valid practicing certificates can apply for a smart card, the holder of the card and the firm is responsible with regard to the security, authorization and delegation of the usage of the smart card. The Court advises law firms to draw up internal controls on its usage.

2.6. Are the conceptual requirements for reliability and authenticity developed by the UBC-MAS Project (Duranti and MacNeil, 1999) and InterPARES 1 for administrative and legal records generated within databases and document management systems applicable to the records studied by InterPARES 2?

The UBC project states that the reliability of a record is dependent on the “degree of completeness, degree of control on its creation procedure and/or on the author’s reliability.” This is applicable to the EFS system as any non-compliance on the type of documentary forms based

on the juridical requirements will not be accepted by the courts. The EFS also integrates the business process and the documentary forms of the records by determining the nature of records that are created based on each constituent action. The creation and modification of records is also monitored through the access matrix. In terms of authenticity, there are procedural controls for the handling, use of transmission of records over space.

2.8. What would be the consequence of issuing guidelines for record creation on the nature of the records of each activity?

Guidelines would assist users on how to learn to use the system. In addition, it will also be useful for briefing sessions so as to enforce better understanding. In the case of the Supreme Court., user manual and guides are available online and there are regular briefing sessions conducted by the Singapore Academy of Law.

Domain 3 Research Questions

3.1. How do the appraisal concepts, methods and models developed by InterPARES 1 for the administrative and legal records created in databases and document management systems apply to the appraisal of the records of artistic, scientific and government activities resulting from the use of the technology examined by InterPARES 2?

Appraisal of records in the context of this case study would involve assessing the value of the records. There are mainly two types of values associated with the appraisal of court records. First, there is the legal value of the records, as the Court recognizes the need to “preserve documents laying out the right of individuals; and the need to preserve information for use in a posteriori evaluation of the services offered to the public.” Second, the Court acknowledges that “documentary heritage must be preserved and made accessible” and, as such, there is a historical, social and archival value associated with the appraisal of records. The National Archives of Singapore is responsible for determining the archival value of records.

3.2. How do the preservation concepts, methods and models developed by InterPARES 1 for the administrative and legal records created in databases and document management systems apply to the preservation of the records of artistic, scientific and government activities resulting from the use of the technologies examined by InterPARES 2?

Although there is a retention schedule for bankruptcy records in the traditional paper environment, there is not yet an articulation or directive with regard to the long-term preservation of records in the EFS, apart from the need to constantly migrate technologies. One tentative option that is considered is to outsource the management of digital certificates to a licensed certification authority so that they can be “insulated from managing technology obsolescence.” However, there is still a need to address the preservation of authentic copies of electronic records. Another observation from the case study that is applicable to InterPARES I is the need to fix the record and put it aside for action or reference. In the case of the EFS, the records that are put aside in the system consist of the documentary template and the PDF court records.

Policy Cross-domain Research Questions

4.1a. To what extent do policies, procedures and standards currently control records creation, maintenance, preservation and use in each focus group?

The main policy driving the use of the EFS is the legal compliance and compulsory requirement that law firms have to submit records using the system. Part XI, Section 47 of the *Electronic Transaction Act* (1998) states the acceptance on the use of electronic filing. The agency may specify

- a) the manner and format in which such electronic records shall be filed, created, retained or issued,
- b) where such electronic records have to be signed, the type of electronic signature required (including, if applicable, a requirement that the sender use a digital signature or other secure electronic signature);
- c) the manner and format in which such signature shall be affixed to the electronic record, and the identify of or criteria that shall be met by any certification authority used by the person filing the document;
- a) control processes and procedures as appropriate to ensure adequate integrity, security and confidentiality of electronic records or payments; and
- b) any other required attributes for electronic records or payments that are currently specified for corresponding paper documents.

In other words, although the Act does not make it compulsory for agencies to use electronic filing and transaction, the agency can specify the necessary standards, processes and procedures to ensure the integrity and safe transmission of records.

In addition, Section 35 of the *Evidence Act* (1997) states that “computer output” is admissible in a court of law and is based on the following factors:

- a) agreement between parties that “neither its authenticity not the accuracy of its contents are disputed”;
- b) “produced in an approved process”;
- c) “no reasonable ground for believing that the output is inaccurate because of improper use of the computer and that no reason exists to doubt or suspect the truth or reliability of the output”; and
- d) “there is reasonable ground to believe that at all material times the computer was operating properly, or if not, that in any respect in which it was not operating properly or out of operation, the accuracy of the output was not affected by such circumstances.”

Item b on “approved process” refers to document imaging systems.

4.3. How can enhanced control over and standardization of records creation, maintenance, preservation, access and use be balanced against cultural and juridical differences and perspectives on issues such as freedom of expression, moral rights, privacy and national security?

Although the *National Heritage Board Act* (1993) empowers the National Archives of Singapore (NAS) to make available records for research and for consultation, this is also dependent on the “conditions or restrictions imposed by the office, officer or person from whom the public archives or recordings were acquired, and such conditions as the director of National Archives may consider necessary for their preservation.” In the case of bankruptcy records, the information contained would have privacy concerns as they contain the personal particulars of debtors such as their names, address and amount of debts. As such, access to such records would be based on a need to know basis. Law firms are required to seek approval from the Supreme Court before they are granted access to the case records.

4.5a. What principles should guide the formulation of policies, strategies and standards related to the creation, accurate and authentic records in the digital environments under investigation?

This should include policies and standards on information security, reliability, integrity and long-term preservation of authentic copies of electronic records. The Singapore Government Instruction Manual has a policy on ICT security that stresses the need for agencies to develop and implement their own security policies, preferably during the early stages of the system life cycle. Agencies should also educate their staff on security awareness and test their system periodically for security vulnerabilities. The Policy on Data Administration states agencies should establish a Data Administration Group comprising of senior management and data owners to ensure that information is accurate, complete, consistent and timely. The Policy on the Preservation and Disposal of Government Electronic Records, which was contributed by the National Archives of Singapore, states that agencies are responsible for the authenticity and reliability of electronic records before they are transferred to archival custody.

4.5b. What principles should guide the formulation of policies, strategies and standards related to the appraisal of those records?

As mentioned in the answer to the Domain 3.1 question, there are two value propositions with regard to the appraisal of the records, namely the legal and the archival value. As mandated by the *National Heritage Board Act* (1993), public records that are “national or historical significance shall be transferred to the care and control of the National Archives in accordance with such schedules or other agreements for the transfer of records as may be agreed on between the Board and the public office or person responsible for public records.” To-date, there is no long term strategy with regard to the long-term preservation of electronic records in the EFS partly because the creator opined that the system is relatively new. In any case, it is of the creator’s interest to ensure the long term accessibility of its records so as to fulfill its business function and service its customers. In the Policy on the Preservation and Disposal of Government Electronic Records, NAS has specified that the electronic records of archival value should be stored in open-platform independent formats, except when it is administratively/technically not

possible. NAS may also recommend that electronic records be reformatted onto microfilm. The policy also states that the archives will only accept decrypted electronic records of archival value. Agencies may continue to keep encrypted records that serve legal purposes.

4.7. What should be the criteria for developing national policies, strategies and standards?

Long-term preservation and access to electronic records, secure transmission and preservation of records, criteria for maintaining and preserving authentic and reliable electronic records.

Terminology Cross-domain Research Questions

5.1a. Is the term proposed specific to a field? If so, is its definition agreed upon in such field?

Please refer to the answers to the Domain 2.1a, 2.2a and 2.3a questions for the creator's definition of authenticity, accuracy and reliability.

Description Cross-domain Research Questions

6.2a. What is the role of descriptive schemas and instruments in records creation, control, maintenance, appraisal, preservation, and use in emerging recordkeeping systems in the digital and Web-based environments in the three focus areas?

The type of metadata used in the front end application would typically consist of the following:

- Firm's File Reference Number: each individual case file is assigned with a unique file reference number by the law firm;
- Case Number: case number assigned by the courts once it is accepted;
- Court Type;
- File Name: name of the case file; and
- Created on: date when the case was first created.

The above metadata elements for the EFS were drawn up based on their traditional paper environment. At the Court's workflow application system, the metadata for bankruptcy case files include the case number, name of petitioning creditor and name of debtor. As agencies exchange information across networks, there is a need to develop common descriptive schemas and exchange formats.

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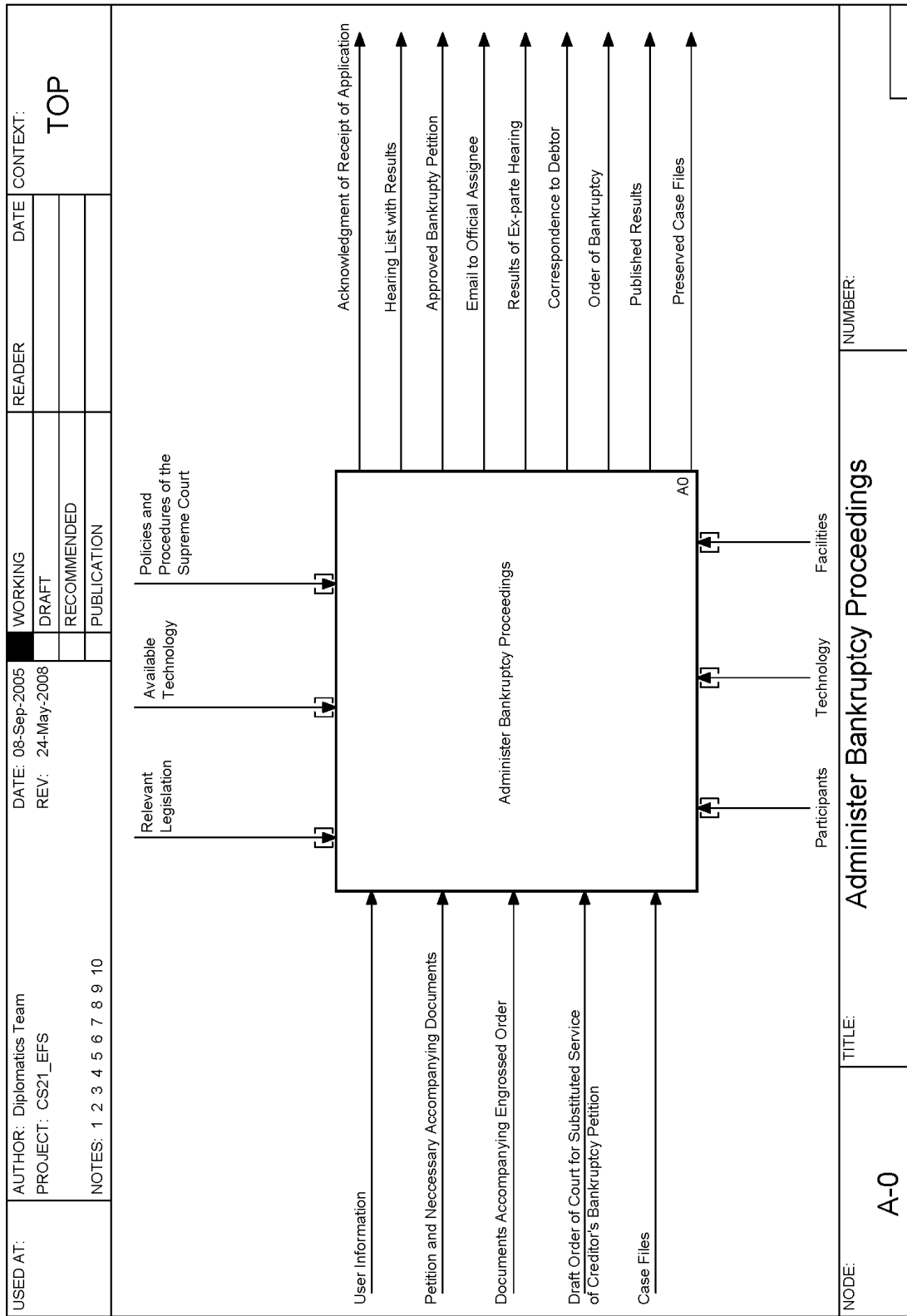
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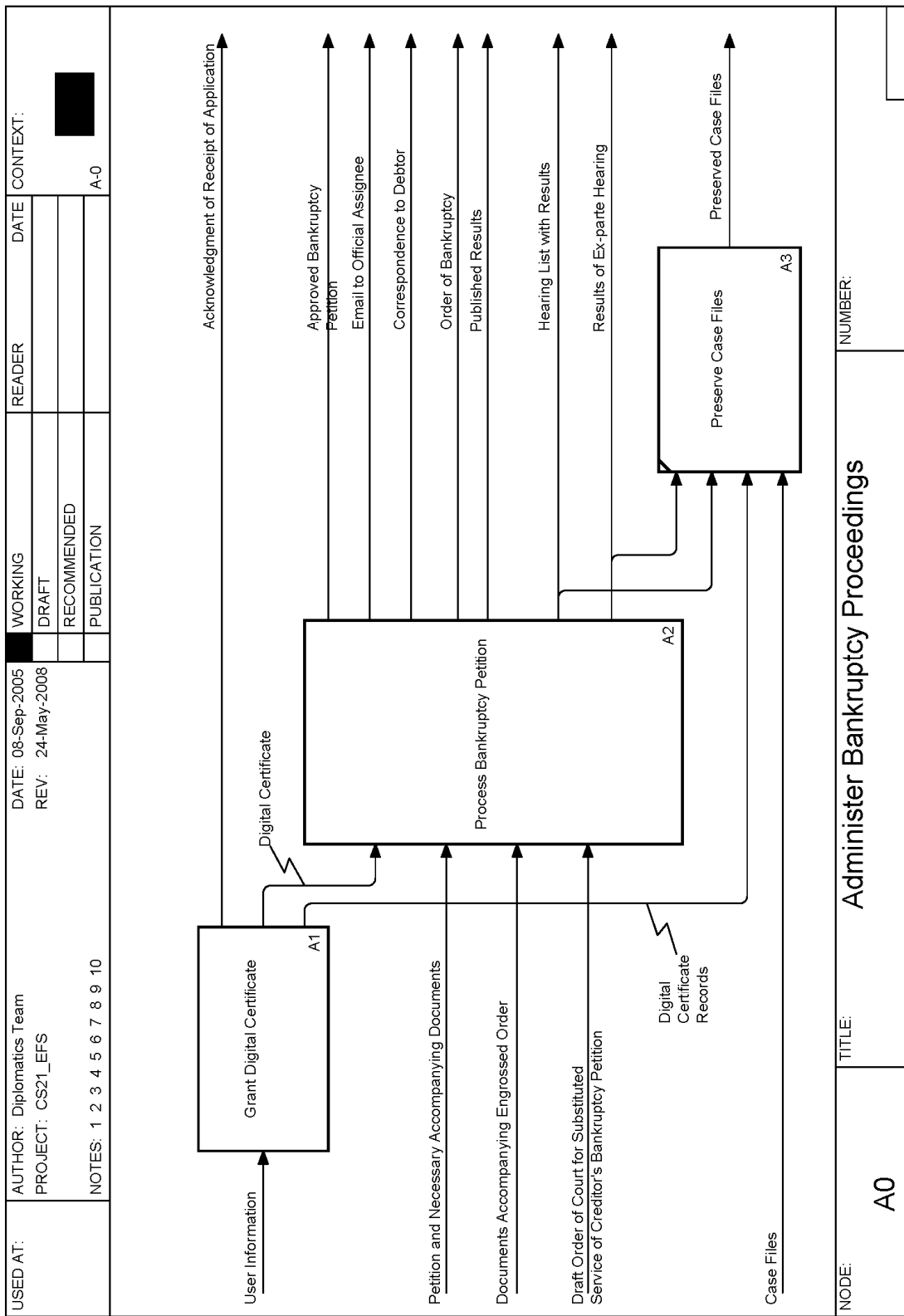
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G. IDEF0 Activity Model

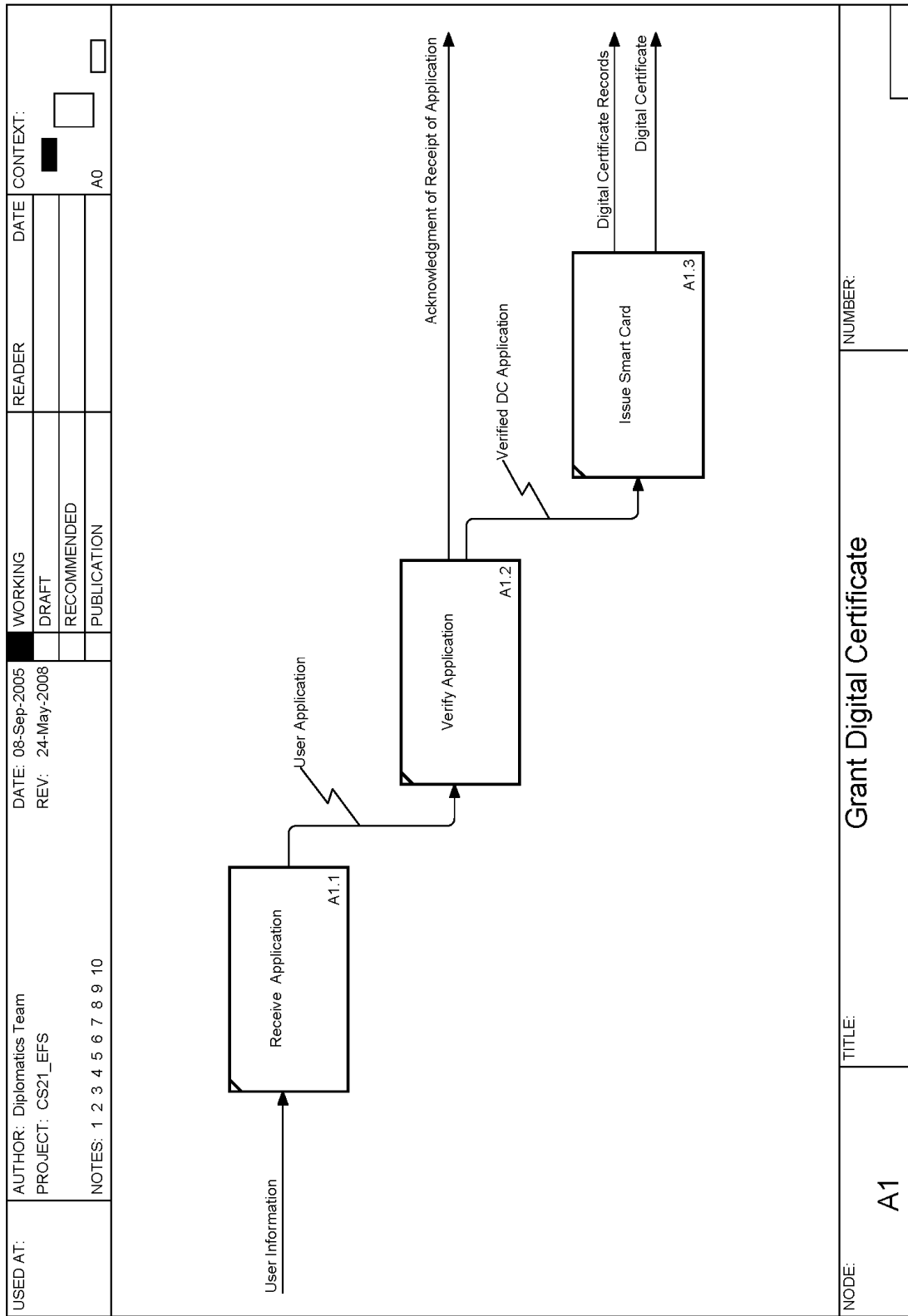




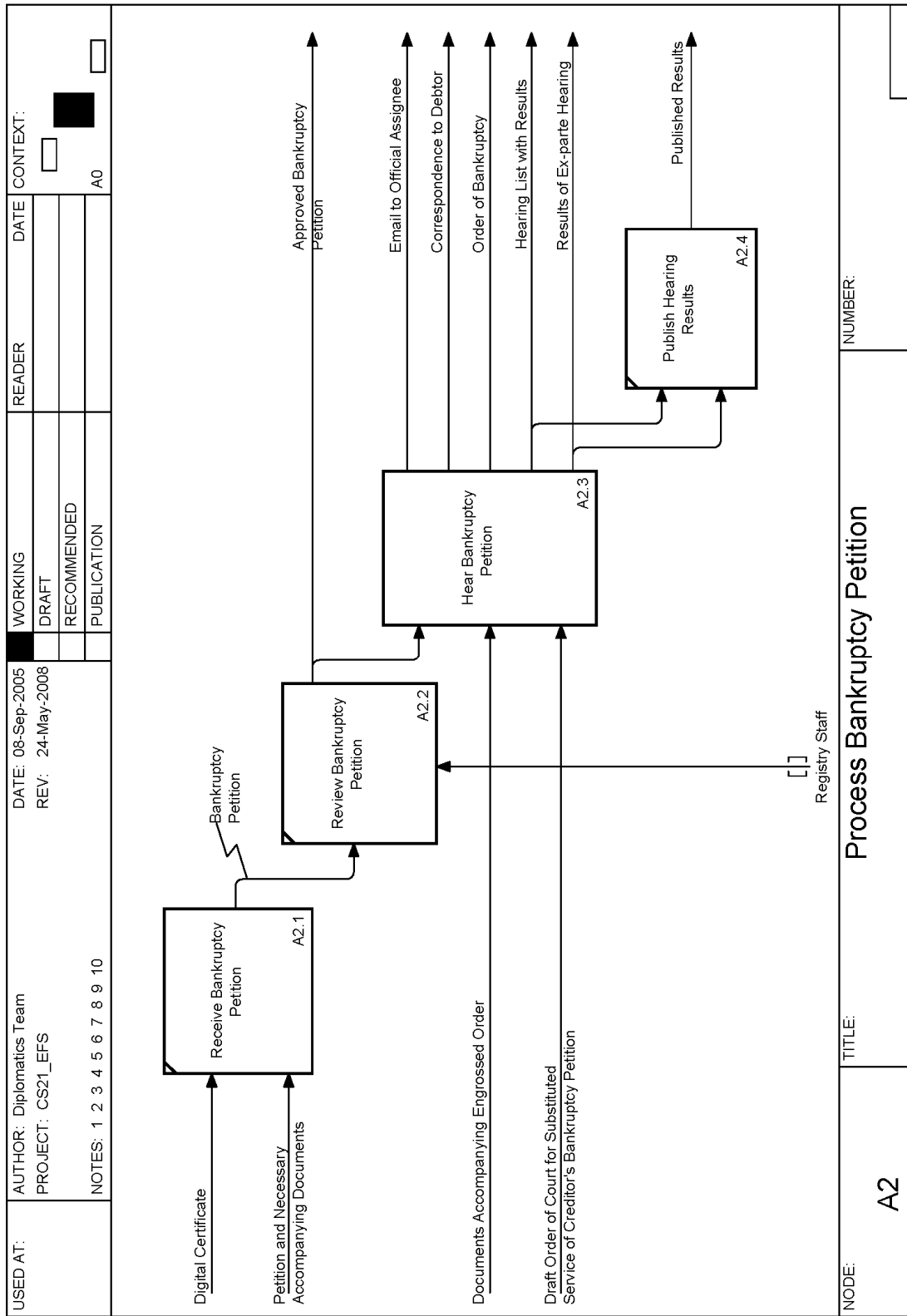
Administer Bankruptcy Proceedings

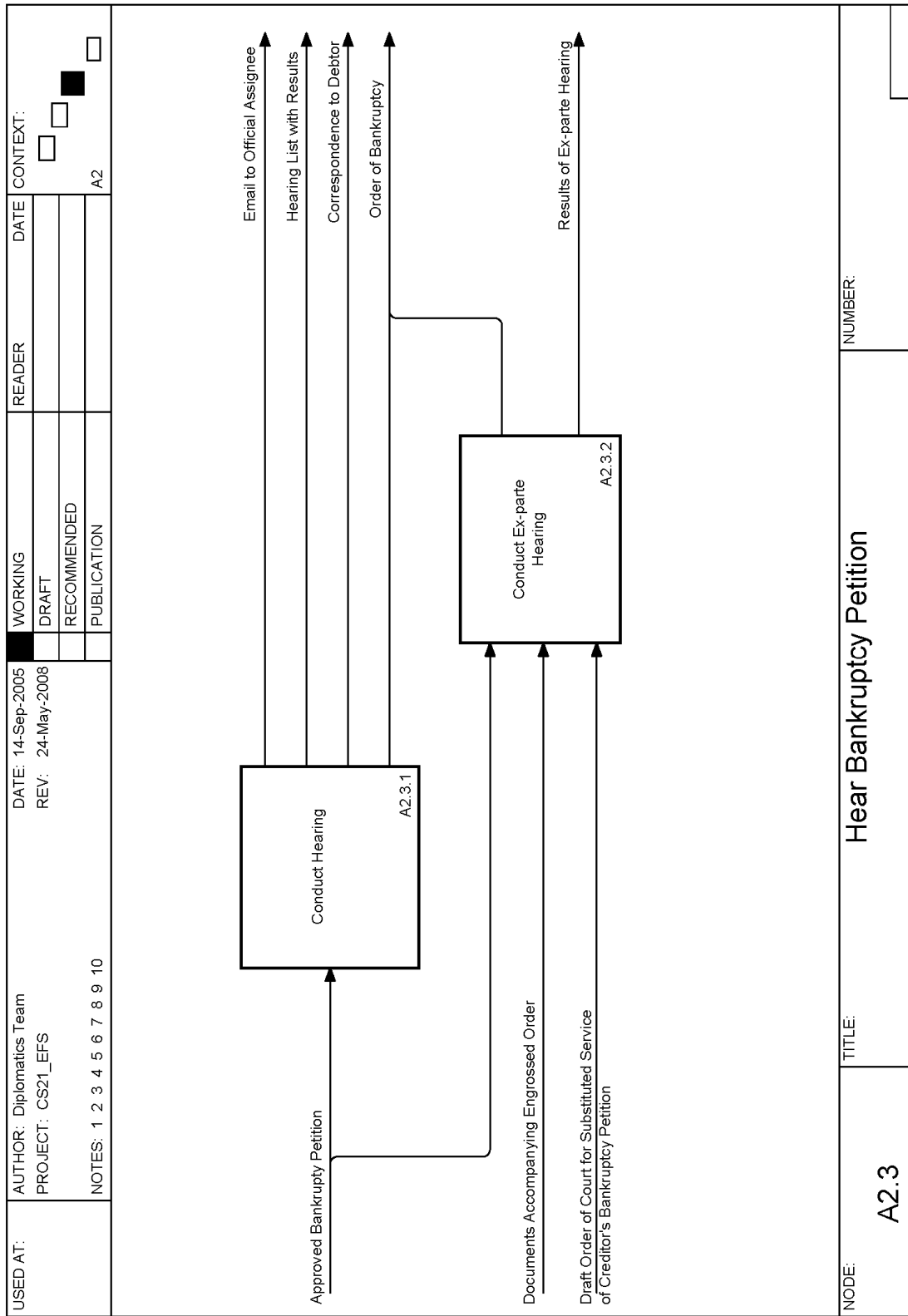
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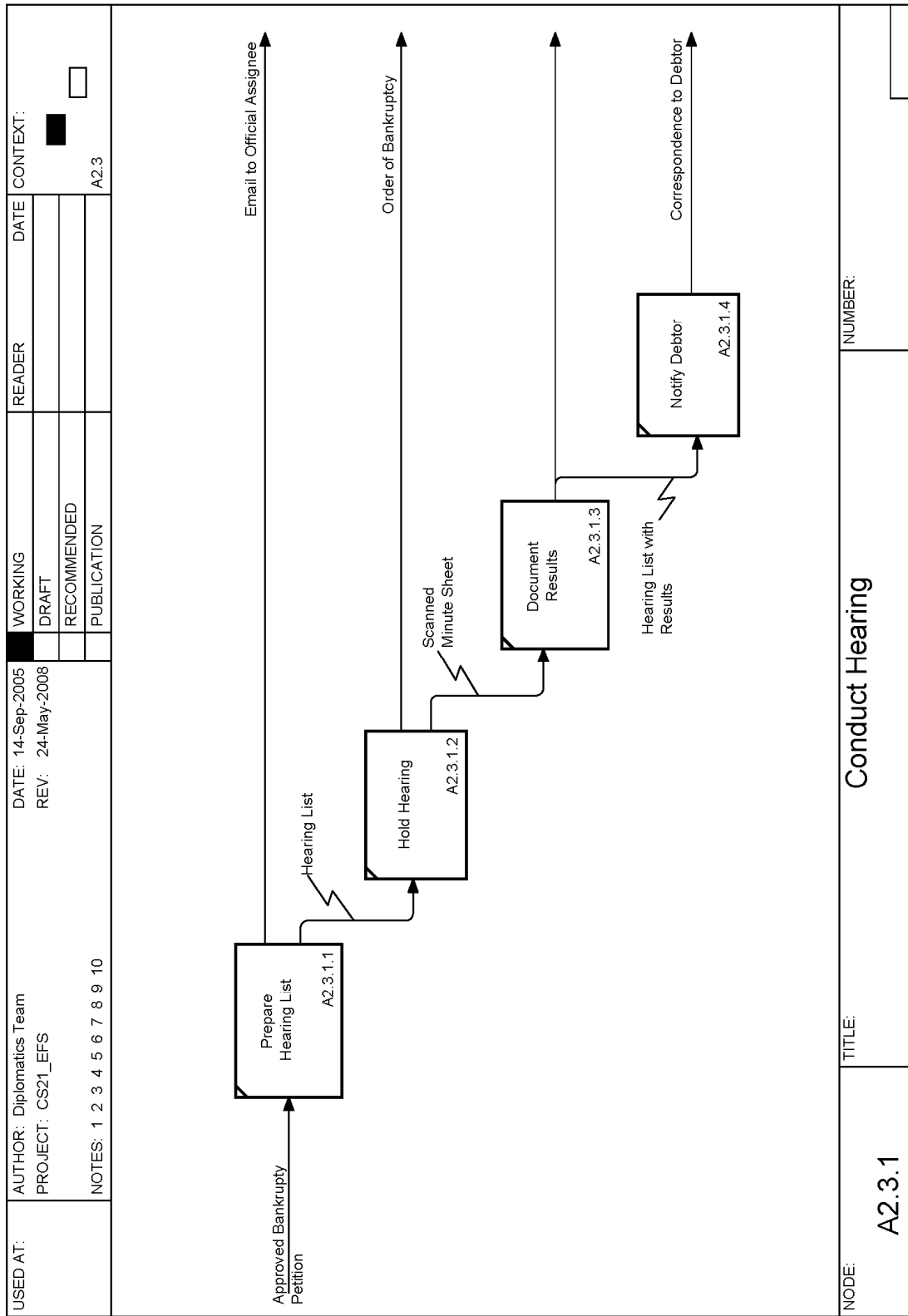
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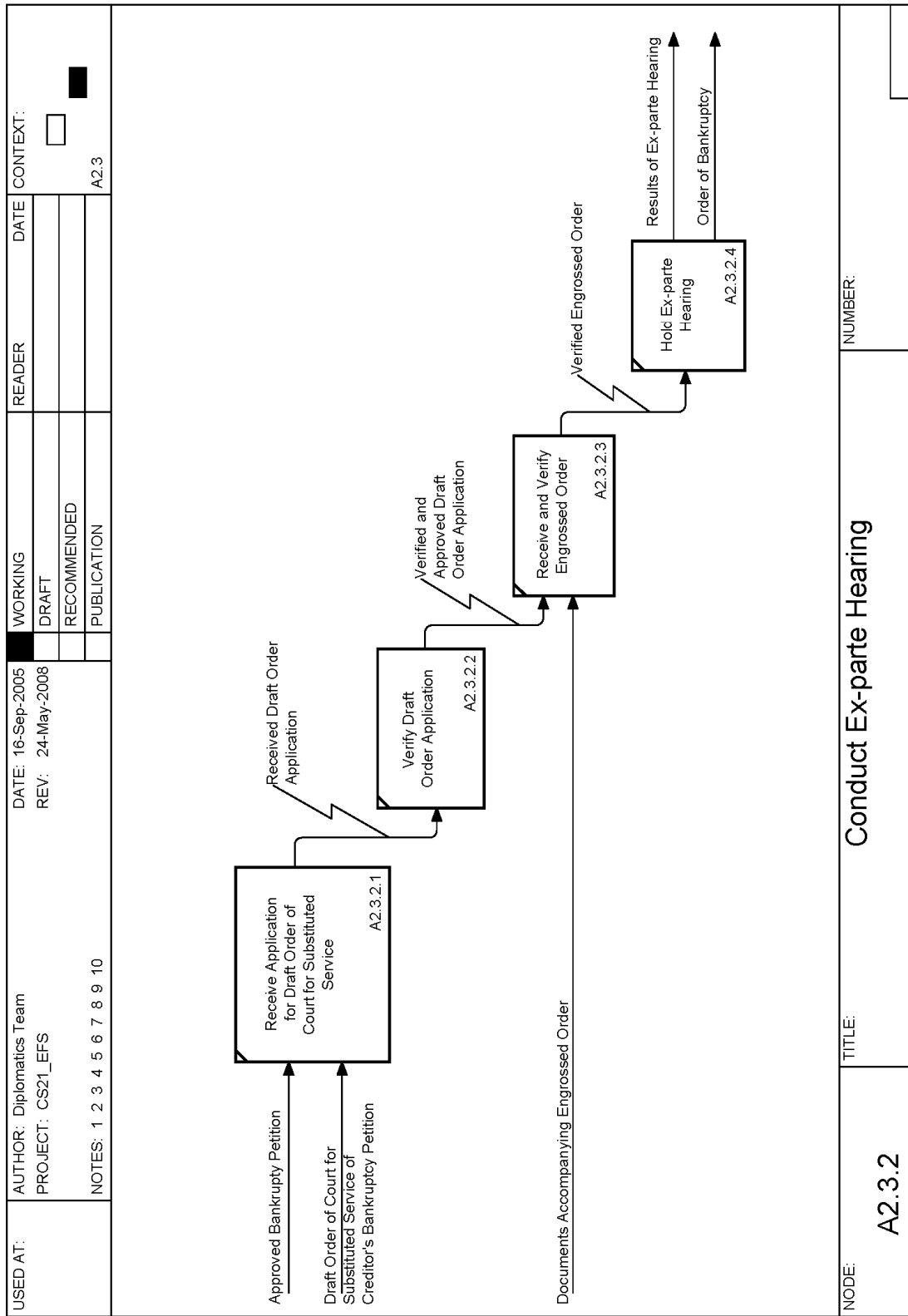
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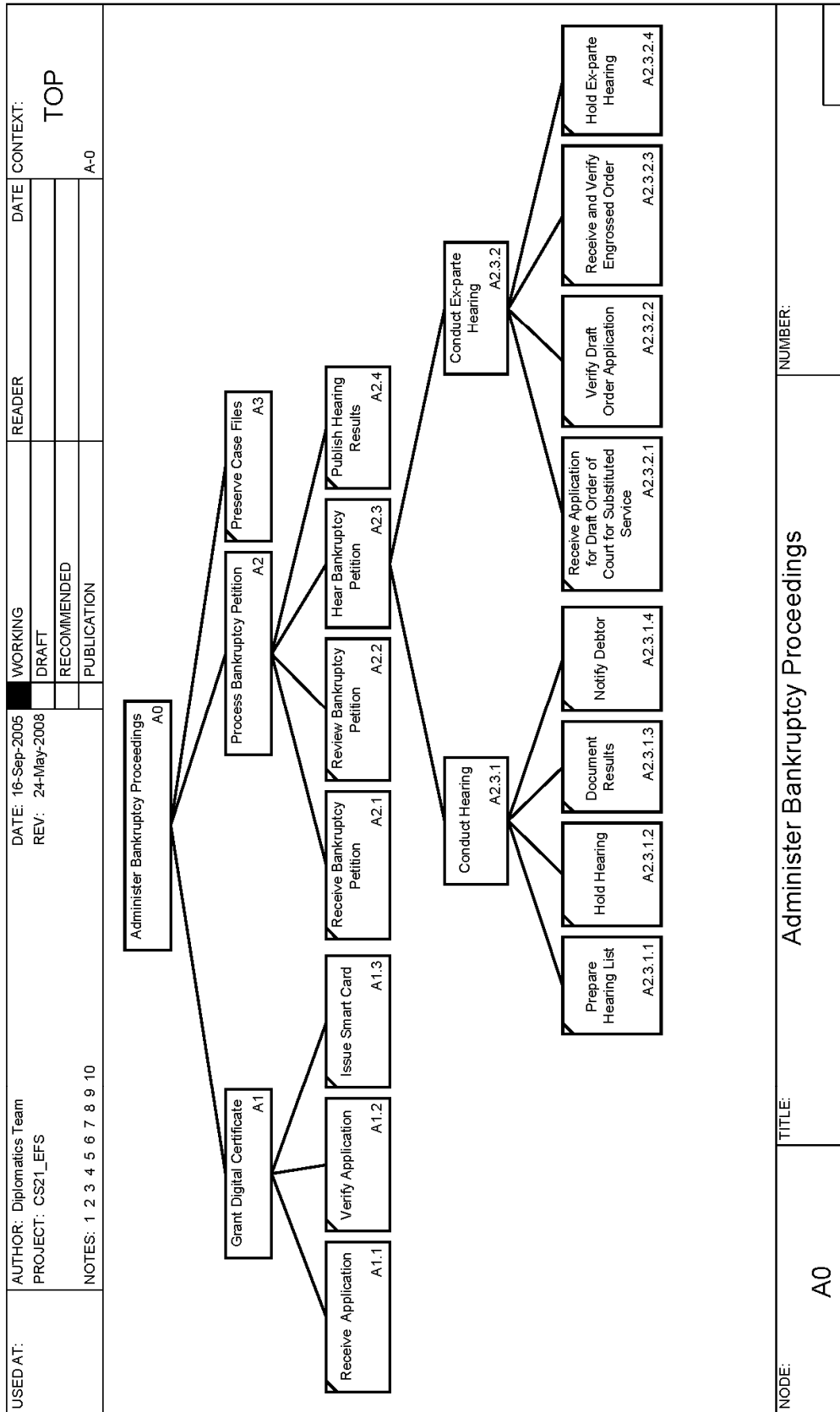






NODE: A2.3.1	TITLE: Conduct Hearing	NUMBER: []
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NODE: A0	TITLE: Administer Bankruptcy Proceedings
NUMBER:	

CS21 – Electronic Filing System (EFS) of the Supreme Court of Singapore, IDEF0 Model Activity Definitions			
Activity Name	Activity No.	Activity Definition	Activity Note
Administer Bankruptcy Proceedings	A0	To facilitate the proceedings associated with a bankruptcy petition.	This entire model is constructed to reflect what happens when an order has been granted.
Grant Digital Certificate	A1	To receive application, to verify application, and to issue Smart Card.	The law firm will assist each individual solicitor to apply for a Smart Card which generates public and private key pairs. The private key is written on the Smart Card and the public key is sent to the Court.
Receive Application	A1.1	To receive Smart Card application from a solicitor.	
Verify Application	A1.2	To verify the accuracy and completeness of the Smart Card application.	The Supreme Court acts as the Certifying Authority.
Issue Smart Card	A1.3	To issue Smart Card for user authentication and system security.	The Smart Card generates the Digital Certificate which contains all the information that identifies the holder.
Process Bankruptcy Petition	A2		
Receive Bankruptcy Petition	A2.1	To receive bankruptcy petition from the petitioning creditor.	The Bankruptcy Petition will be filled if the debtor does not comply with the statutory demand within 14 days and must be filled within 4 months from the date the statutory demand was served.
Review Bankruptcy Petition	A2.2	To review the documentary form of the record and to ensure that the business process as prescribed by the various legislations governing the filing of bankruptcy petitions has been followed.	This is performed by the registry staff.
Hear Bankruptcy Petition	A2.3	To conduct hearing or ex-parte hearing.	If the debtor cannot be located to be served with a Bankruptcy Petition steps will be taken to conduct a hearing ex-

CS21 – Electronic Filing System (EFS) of the Supreme Court of Singapore, IDEF0 Model Activity Definitions			
Activity Name	Activity No.	Activity Definition	Activity Note
			parte.
Conduct Hearing	A2.3.1	To carry out and record the proceedings of the hearing in the presence of the debtor.	
Prepare Hearing List	A2.3.1.1	To prepare a hearing list.	Involves the following processes: downloading the hearing list, informing the Official Assignee of the hearing date, posting this list on the Supreme's Court's notice board, and assigning case files to the Assistant Registrar.
Hold Hearing	A2.3.1.2	To hold hearing and record the proceedings on the minute sheet in hard copy which is then scanned into EFS.	
Document Results	A2.3.1.3	To document the hearing results into the hearing list.	This is carried out by Registry staff.
Notify Debtor	A2.3.1.4	To notify the debtor of the results of the hearing.	The debtor is notified by the Official Assignee.
Conduct Ex-parte Hearing	A2.3.2	To conduct a bankruptcy hearing when a debtor cannot be located.	
Receive Application for Draft Order of Court for Substituted Service	A2.3.2.1	To receive the Application for Draft Order of Court for Substituted Service from the solicitor when the debtor cannot be located.	
Verify Draft Order Application	A2.3.2.2	To verify and approve the Application for Draft Order of Court for Substituted Service by checking that the information is accurate.	This procedure is carried out by the Registry staff.
Receive and Verify Engrossed Order	A2.3.2.3	To receive the Engrossed Order, then affix the seal of the court and the signature of the Registrar.	The Engrossed Order is only sent after the Draft Order Application has been approved.
Hold Ex-parte Hearing	A2.3.2.4	To hold a hearing without the presence of the debtor (ex-parte), and record the proceedings on the minute sheet in hard copy which is then	

CS21 – Electronic Filing System (EFS) of the Supreme Court of Singapore, IDEF0 Model Activity Definitions			
Activity Name	Activity No.	Activity Definition	Activity Note
		scanned into EFS.	
Publish Hearing Results	A2.4	To create and publish a report of the hearing, with the Bankruptcy Order, in the Gazette.	This action only occurs when the Order of Bankruptcy is granted. It is scanned into EFS.
Preserve Case Files	A3	To preserve all of the records in case files which are produced in the course of administering the bankruptcy petition by storing them in optical disks and the Oracle database.	

CS21 – Electronic Filing System (EFS) of the Supreme Court of Singapore, IDEF0 Model Arrow Definitions		
Arrow Name	Arrow Definition	Arrow Note
Acknowledgment of Receipt of Application	A notice sent to users to acknowledge receipt of their application.	
Approved Bankruptcy Petition	Bankruptcy Petition that has been affixed with the Court's signature and seal.	The approved Bankruptcy Petition is sent by EFS to the law firm and a copy is also sent to the Official Assignee.
Available Technology	The capabilities of the technology available at any given time.	
Bankruptcy Petition	Bankruptcy Petition received from user.	
Case Files	All the records produced in the course of administering the bankruptcy petition.	
Correspondence to Debtor	The correspondence sent to the debtor from the Official Assignee declaring his or her assets.	
Digital Certificate	Digital Certificate issued to the user.	Smart key
Digital Certificate Records	The user information and the digital certificate.	
Documents Accompanying	The documents that must accompany the engrossed order	

CS21 – Electronic Filing System (EFS) of the Supreme Court of Singapore, IDEF0 Model Arrow Definitions		
Arrow Name	Arrow Definition	Arrow Note
Engrossed Order	which include Ex-parte Summons in Chambers, and Affidavit in Support of Application for Substituted Service.	
Draft Order of Court for Substituted Service of Creditor's Bankruptcy Petition	The order of the draft submitted by the law firm when the debtor cannot be found at his/her place of residence or business address.	
Email to Official Assignee	Email the scheduled hearings to the Official Assignee.	
Facilities	The physical space that hosts the server and the database.	
Hearing List	The approved schedule of hearings.	
Hearing List with Results	The approved hearing list with results.	This is faxed to the Official Assignee.
Order of Bankruptcy	The Order of Bankruptcy is drafted by solicitors and approved by the Court, whereby it is sent to the debtor.	The Order of Bankruptcy is only sent if it is granted.
Participants	All of the people involved in the transaction of carrying out the bankruptcy petition.	
Petition and Necessary Accompanying Documents	The documents required by the Bankruptcy Act to accompany the petition.	See the report for further details.
Policies and Procedures of the Supreme Court	Established policies and procedures of the Supreme Court to ensure that the bankruptcy proceedings are carried out properly.	
Preserved Case Files	All the preserved records produced in the course of administering the bankruptcy petition.	
Published Results	The published results of the hearing including the Bankruptcy Order in the Gazette.	This is scanned into EFS.
Received Draft Order Application		
Registry Staff	The staff responsible for maintaining the EFS registry.	
Relevant Legislation	The three main pieces of legislation related to the filing and serving of bankruptcy records in Singapore are the Bankruptcy Act (1995), the Bankruptcy Rules (1995), and the Electronic Transaction Act (1999).	

CS21 – Electronic Filing System (EFS) of the Supreme Court of Singapore, IDEF0 Model Arrow Definitions		
Arrow Name	Arrow Definition	Arrow Note
Results of Ex-parte Hearing	The results of the hearing without the presence of the debtor (ex-parte).	
Scanned Minute Sheet	The scanned sheet of hearing minutes.	
Technology	All of the hardware and software used by EFS.	See Final Report for details.
User Application	The application sent in by the user with required fields entered.	
User Information	The information about the identity of the user and any other information required by the Court, including proof of a valid practicing certificate.	
Verified and Approved Draft Order Application		
Verified DC Application	Verified user application.	
Verified Engrossed Order	The Engrossed Order that has been affixed with the seal of the court and the signature of the Registrar.	