Opening

- **Event:** **eMacao Seminar, Thursday 1 June 2006**
- **Speaker:** **Dines Bjørner**
- **Affiliations:**

Computer Science and Engineering	School of Information Science
Informatics and Mathematical Modelling	JAIST
Technical University of Denmark	1-1, Asahidai, Tatsunokuchi,
Bldgs. 305, 321–322, 325	Nomi, Ishikawa 923-1292
DK–28000 Kgs.Lyngby, **Denmark**	**Japan**
db@imm.dtu.dk	bjorner@gmail.com

http://jaist.ac.jp/~bjorner

Topic 0

eminar Title: Good Governance through Software Technology

Seminar Abstract

1. From **Lawmaking Government** and its **Documents** via **Law Enforcing Government** and its **Documents** to **Law Interpreting Government** and its **Documents**.
2. An examination of **Documents**, their **Creation, Editing, Copying, Distribution, Searches, Calculations** and **Shredding**, and of the **Tracing, Authorisation**, and **Licensing** of **Document** handling.
3. $\mathcal{E}^2\mathcal{G}$: **E**ssential **E**lectronic **G**overnment: From (1.) and (2.) to (3.): $\mathcal{E}^2\mathcal{G}$.

Agenda

- First an informal review of
  - ⋆ the three branches of government,
  - ⋆ their interaction,
  - ⋆ and their interaction with citizens.
- Then an informal review of the documents arising from actions of these branches of governments and the citizens.
- After that a more formal review of document handling: creation, editing, copying, contents-searches, calculation, hisotry, tracing, shredding, authorisation, and licensing.
- And finally a discussion of how $\mathcal{E}^2\mathcal{G}$ computers & communication may help these processes.

Overview of Slides and Disposition of Seminar

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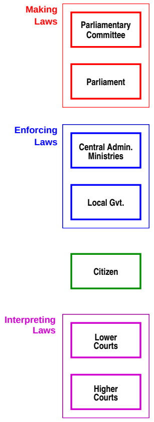
Topic 1

An Informal View of Public Government

- Public government, in this seminar, consists of
  - ⋆ the **lawmakers:** Parliament
  - ⋆ the **law enforcers:** Central and local government
  - ⋆ and the **law interpreters:** Judiciary system
- **Citizens** interact with all three branches of government.



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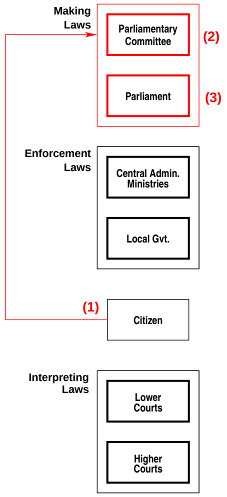
1. Citizens through the process of debate provoke their parliament to discuss societal problems.
2. A parliament committee discusses a specific societal problem.
3. Their deliberations are "sent" as a law proposal to parliament which debates the issue and passes some law.



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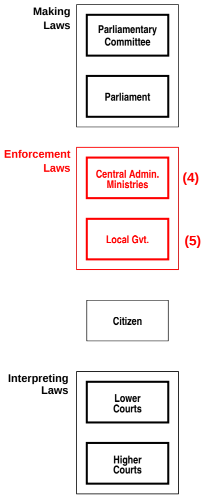
4. The law is passed on to an appropriate ministry (of the central government) and that ministry formulates basic rules & regulations for how local governments shall administrate uses of the law.
5. The local governments makes provisions for handling the law locally.



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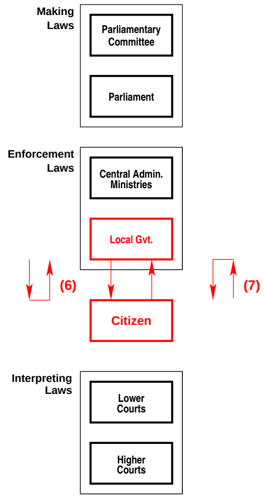
6. The citizen is either
   - contacted by the local government
   - and asked to report on some issue (tax, traffic violation, or other),
   - and the citizen replies.
7. or the citizen
   - contacts the local government
   - in order to apply for something (passport, pension benefits, ot other)
   - And the local government replies.



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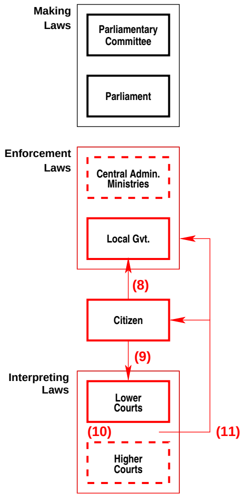
8. The citizen is either accepts the dicision of local government,
9. or the citizen
   - does not accept the dicision,
   - and complains to the courts.
10. The "due process of law" takes place.
11. Eventually the judiciary system hands down a decision
    - either in favour of the citizen,
    - or in favour of the governement,
    - or both!



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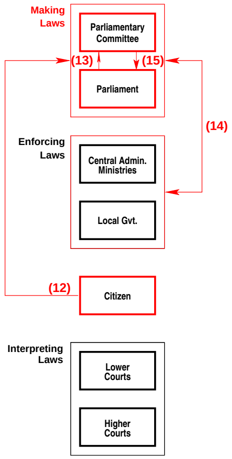
Flow of Documents in Public Administration

12. Citizens may direct a problem petition to parliament — in the form of a document signed by many citizens.
13. Parliament decides to "do something" (or not to do anything) about the problem. A response document is produced.
14. A designated parliament committee requests an appropriate ministry to prepare some "background" document.
15. The parliament committee passes discussion and a law proposal documents to parliament.



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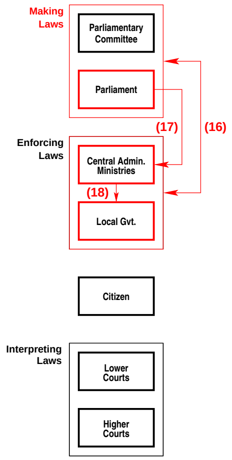
16. Parliament requests further "background" documents from the central administration, and receives these.
17. Parliament debates the law proposal and passes a law, which, as a document is sent to the appropriate ministry for further handling — and otherwise published in the law gazette.
18. The ministry and its departments, i.e., the central administration, formulates procedures for the enforcement of the law and sends these, as documents to local administrations.



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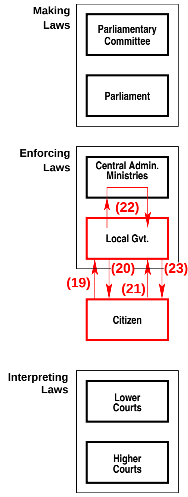
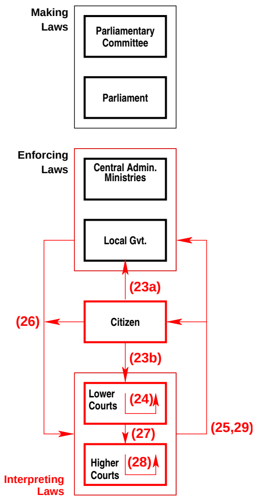
19. A citizen applies for some permission, that is, an application document is sent to a local administration — or a citizen breaks the law (symbolised with the virtual arrow from citizen to a local authority).
20. The local administration sends a receipt (a citation) document, possibly forwards further documents to be filled in, and gives a conditional date by which a decision can be expected.
21. The citizen sends in the possibly further requested documents.
22. The local administration communicates various documents related to the case to/from other public government offices.
23. And finally the citizen receives a response document.



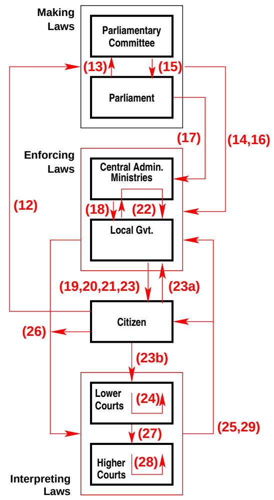
23. The citizen
    (a) either sends an acceptance document to the local administration,
    (b) or rejects it, informing the local administration of this, and directs a complaint at the law courts.
24. The first instance law court deliberates (i.e., documents are produced),
25. a decision is sent to the citizen and the local admin.,
26. Either the local administration or the citizen both accepts the decision and further actions are curtailed, or at least one of them appeals the decision.
27. Lower court decision documents are passed on to a higher court.

28.–29. And steps (24–25) are repeated till a final decision is passed.



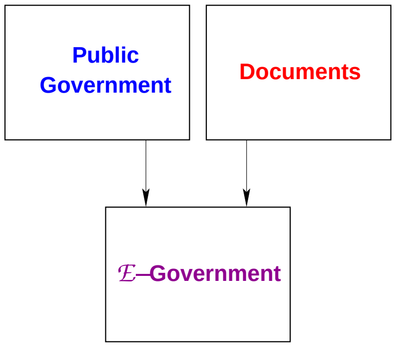
Summary of Documents

12. Citizen petition
13. Parliament response
14. Background briefing
15. Subcommittee discussion and law proposal
16. Further background briefing
17. Law and record of paliament debate
18. Handling procedures and forms
19. Citizen application (or "breakin law event")
20. Local authority reply (or citation)
21. Citizen response to local authority reply
22. Public admin. docs. handling citizen request or infringement
23. "Final" local authority reply/decision
    (a) Citizen acceptance or rejection
    (b) Citizen lawsuit
24. Lower law court handling
25. Lower law court decision
26. Citizen and public administration reaction
27. Transfer of lower law court dcosuments
28. Higher law court handling
29. Higher law court decision (final, final)



Topic 2
Documents — A Closer Analysis

- We present a "story" of documents that is a bit different from what you may be used to.
- The reason is that we are building up, towards the end of this seminar, to a "story" on computers, communication and documents.
- Our "story" on documents is also "completely" independent of our previous "narration" of public government.
- Again there is a reason: towards the end of this seminar we merge the "story" on documents with the "narration" of public government into the subject of $\mathcal{E}$-Government.



Overview of Document Issues

- **Document Operations:**
  Documents are created, are edited, and can be read, copied, moved, can be the basis for searchees and calculations, and can be shredded — by actors.
- **Document Authorisation:**
  Actors have varying degrees of creation, editing, reading, copying, distribution and shredding authority.
- **Document History:**
  Document may reveal their creation, editing, reading, copying distribution, search & calculation history — who did what, when, where!
- **Document Licensing:**
  Unauthorised actors must be prevented from performing designated operations on documents. We achieve this indirectly by introducing and enforcing a regime of licensing based on authorisation.

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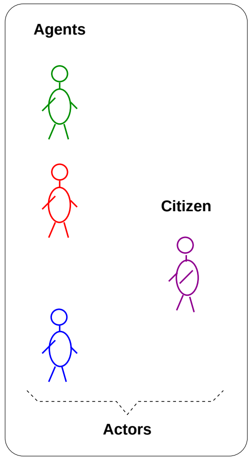
Actors: Citizens and Agents

- Document operations are performed by **actors**.
- **Actors** are either **agents** or **citizens**,
- An **agent** is
  - ⋆ either a person working for a branch of public government,
  - ⋆ or is that branch of public government.
- Of course **citizens** may be agents in some other context,
- that is, a **citizen** is a person interacting, not as an agent, with agents of public government.



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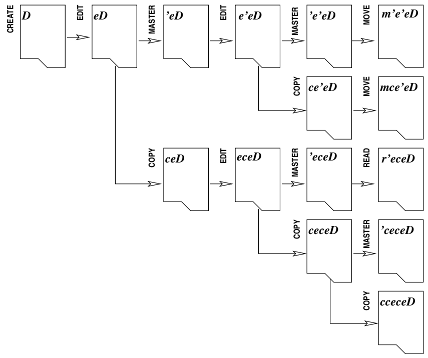
Document Operations

- Document operations are performed by **actors**.

30. Documents can be **created**.
31. Documents can be **edited**.
32. Documents can be **read**!
33. Documents can be **copied**.
34. Documents can be **moved**.
35. Documents can be **shredded** (not shown).



- An **actor** can at most be performing one operation at a time.
- Documents are "marked" by the **time** and **location** of the operation and by the identity of the performing **actors**.
- Together the **time, location**and **actor identity** forms a **unique document identification**.

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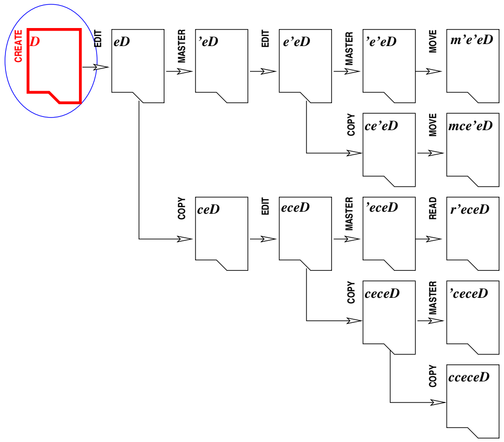
30. Documents can be **created**.
    - Created documents contain no substantial information
    - other than administrative information about
      - ⋆ time and
      - ⋆ location of creation,
      - ⋆ identity of actor who created the document.



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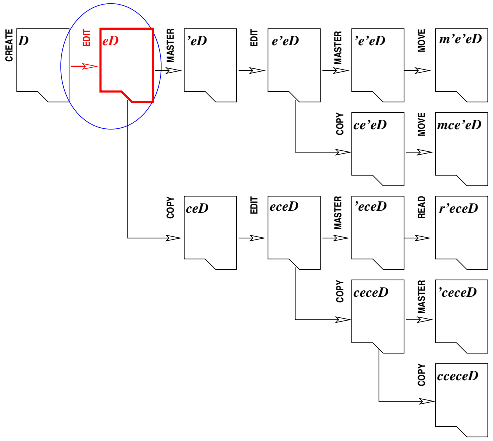
31. Documents can be **edited**.
    - Edited documents are **versions** of the document on the basis of which they were edited.
    - Edited documents contain substantial information.
    - One can read documents while editing them!
    - One cannot copy, move or shred documents during editing.
    - An edited document is different from the document input.
    - The difference amounts to the changed text, time and location of edit, and identity of editing actor.



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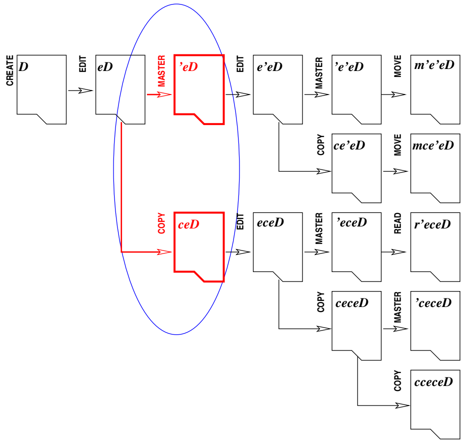
32. Documents can be **copied**.

- As a result the **master** "goes on" to exist
- and a copied, **"the copy"**, document is constructed.
- One cannot edit, move, read or shred the master or the copy documents while copying.
- The location and time of copying is the same for both master and copy.

To **audially communicate**, i.e., to **tell** (speak about) a document (content) to other listeners is the same as **copying** it.



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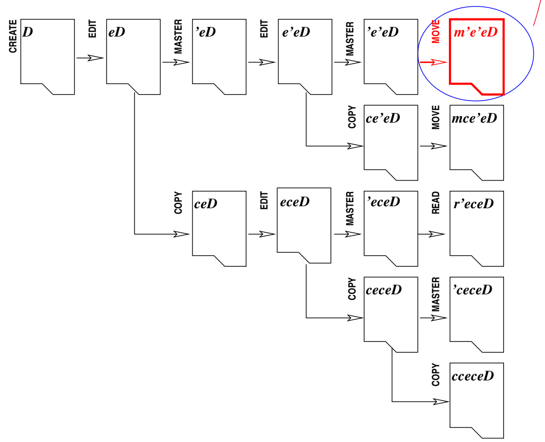
33. Documents can be **moved**.

- They are physically moved from one **location** to another distinct **location**.
- The document "is almost" the same before start and after end of move, only location has changed.
- Documents cannot be copied, edited, read or shredded while being moved.

Instead of **moved** we shall sometimes use the term **distributed**.



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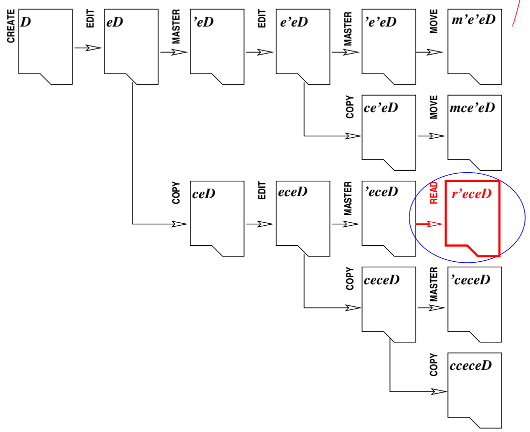

34. Documents can be **read**!

- One cannot edit, copy, move or shred document while only reading them.
- Reading leaves the document unchanged — except that it has now been read, at some time and at some location, by some actor.

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1st Break

- After the break:
  - ⋆ Document **family, version** and **history**
  - ⋆ **Actors**: **agents** and **citizens**
  - ⋆ Document **authorisation** and **licenses**

another break, more on documents and then $\mathcal{E}^2\mathcal{G}$: $\mathcal{E}$ssential $\mathcal{E}$-$\mathcal{G}$overnment

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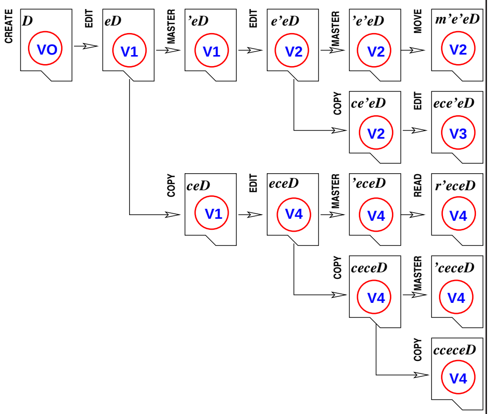
Document Family and Document Versions

- **Document Family**
  - ⋆ The structure to the right designates one document family.
  - ⋆ Every create gives rise to a document family.
  - ⋆ It may grow (copying) and shrink (shredding).
- **Document Version**
  - ⋆ A "just" create document has version 0.
  - ⋆ Every edit of a document creates a new version of that "same" document.
  - ⋆ All other operations leave the version attribute unchanged.
- (Let us not be bothered by how version numbers are generated!)



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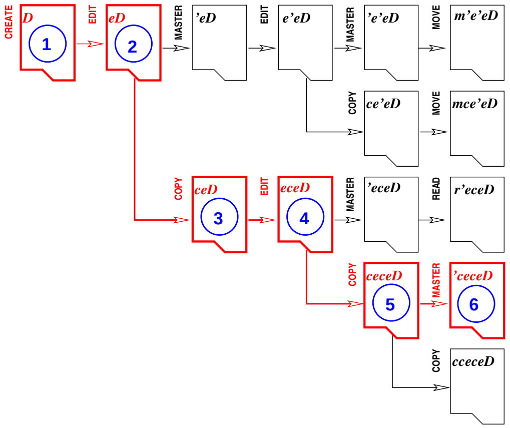
Document History

- From a document we can, "in theory", **trace its unique past**.
- In reverse order of operations:
  - **6** Take the lower right MASTER.
  - **5** It was most recently the BASIS for a **copy**ing.
  - **4** Before that it was the BASIS for an earlier **copy**ing.
  - **3** Before that it was the RESULT of a **copy**ing.
  - **2** Before that it was an **edit**ed version
  - **1** of a **create**d document.



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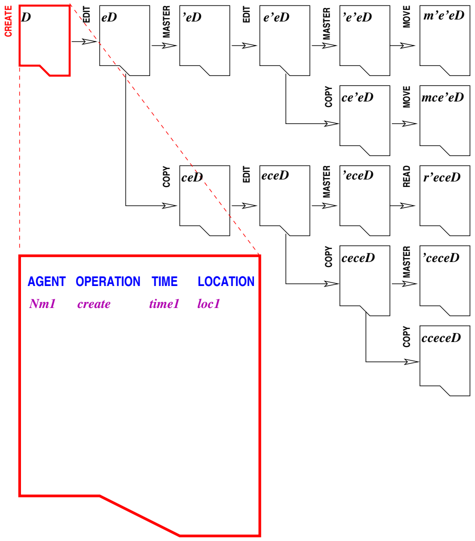
1 Create

- An actor named **Nm1**
- performs operation **create**
- at time **time1**
- on location **loc1**.
- A document is created with just about the only information you see in the lower left corner to the right:



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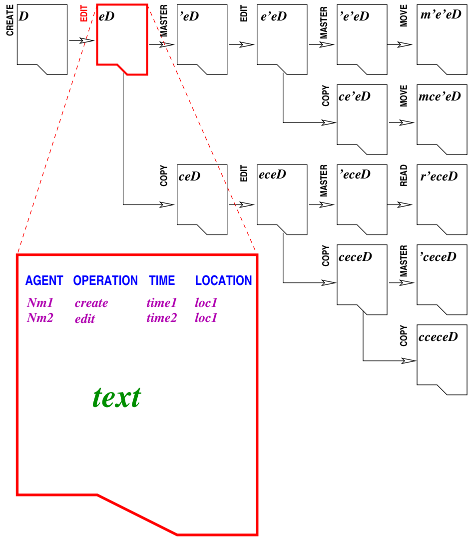
2 Edit

- An actor named **Nm2**
- performs operation **edit**
- at time **time2**
- on location **loc1**
- Document D is extended with text **text** into document eD.



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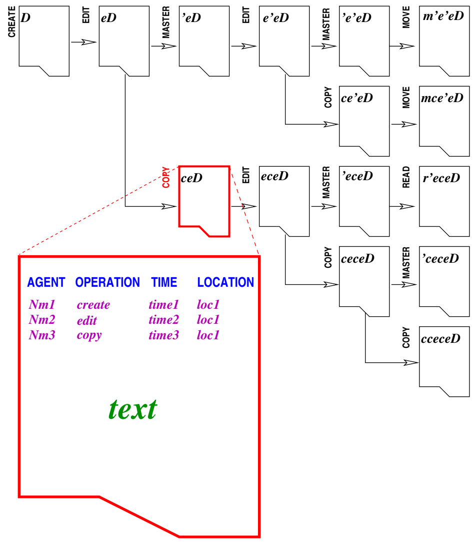
3 Copy

- An actor named **Nm3**
- performs operation **copy** (on *eD* and we focus on the ‘copy’)
- at time **time3**
- on location **loc1**.
- Document *eD* text **text** remains unchanged but is referred to as *ceD*.



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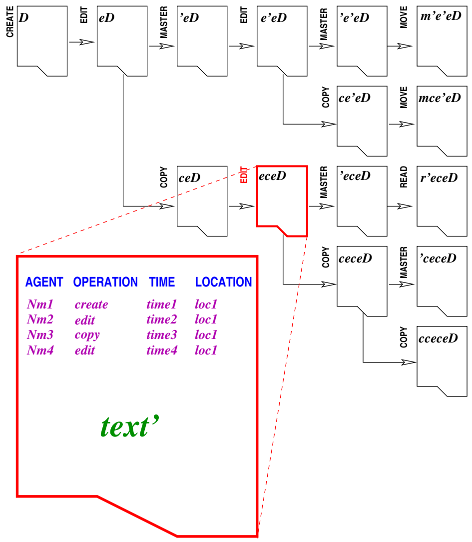
4 Edit

- An actor named **Nm4**
- performs operation **edit**
- at time **time4**
- on location **loc1**.
- Document *ceD* text **text** is changed into document *eceD* **text’**.



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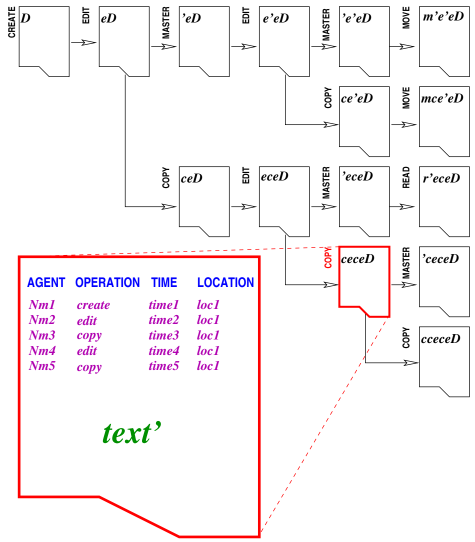
5 Copy

- An actor named **Nm5**
- performs operation **copy** (on *eceD* and we focus on the ‘copy’ *ceceD*)
- at time **time5**
- on location **loc1**.
- Document *ceceD* text **text’** remains unchanged.



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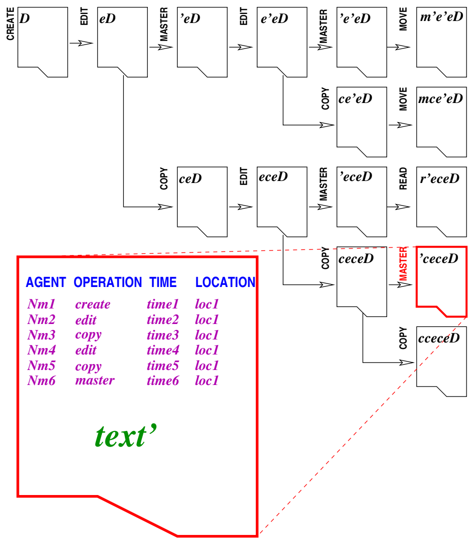
6 Master

- An actor named **Nm6**
- performs operation **copy** (on *ceceD* and we focus on the ‘master’ *′ceceD*)
- at time **time6**
- on location **loc1**
- Document *′ceceD* text **text’** remains unchanged.



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Document Authorisation

Rationale for Authorisation

- We explain the need for introducing a concept that we shall call 'authorisation'.
  - ⋆ Some documents may contain information that not all **actor**s should be aware off.
  - ⋆ For an **actor** to be allowed to perform an operation
    - ⋄ upon (create or edit or copy or read or move or shred) a document
    - ⋄ that **actor** must be so authorised (by some **agent**).
  - ⋆ **Authorisation** can be in the orm of a **license**, a **permit**, to perform an **operation** on some entity, as here, a **document**.

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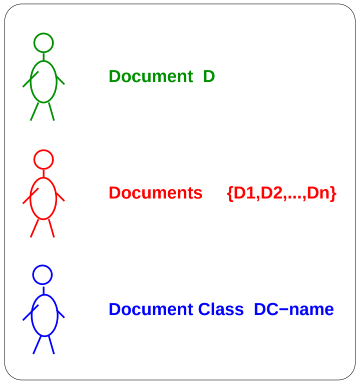
Authorisation of Actors

- Actors can be authorised with respect to (wrt.)
  - ⋆ one specific document whose identity will then be given, or wrt.
  - ⋆ a finite, identified set of documents, or wrt.
  - ⋆ a potentially indefinite class of documents, so we have to introduce a notion of a document class.
  - ⋆ (An example class of documents could be the class of all social security application forms [based on same template]. More on this later.)



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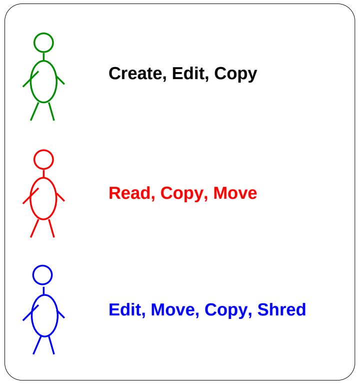
- Actors can, within the designated set of such documents, be authorised wrt. which operations can be performed on these documents:
  - ⋆ **create,**
  - ⋆ **edit,**
  - ⋆ **copy,**
  - ⋆ **search,**
  - ⋆ **move,**
  - ⋆ **read,**
  - ⋆ **shred and**
  - ⋆ **compute.**



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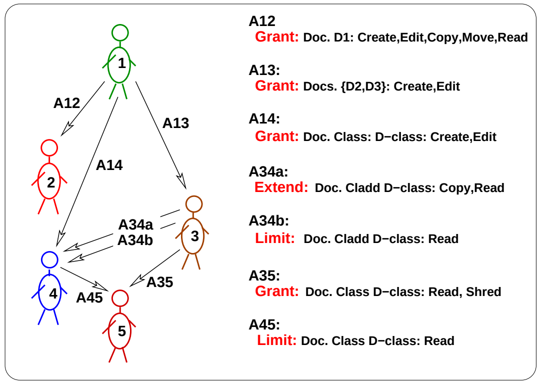
- Actors may be authorised to
  - ⋆ **grant** document handling authorisations to (other) actors,
  - ⋆ **extend** or **limit** previously (by others or by that same actor) granted such document handling authorisations, or
  - ⋆ outright **withdraw** such document handling authorisations altogether.



Granting, Extending and Limiting Licences

The problem of how to initialise the system of document handling authorisations is an interesting one — which we may have time to come back to later.

License Scripts

- A license script is a named text which is issued by one actor to another.
- The license specifies
  - ⋆ a grant,
  - ⋆ an extension,
  - ⋆ a limitation or
  - ⋆ a withdrawal
  - ⋆ of specified document operations
  - ⋆ on specified (licensed) documents.
- A license can also grant permission to issue further licenses.
- We give the grammar of a license script language <LSL>:

License Language, A Grammar

<LSL> ::= <License>**-set**
<License> ::= <Grant> | <Extend> | <Limit> | <Withdraw> | <Grant>
<Grant> ::= <License_name: **actor** <Actor_name>
grants operations <Operations>
to actor <Actor_name>
on documents <Documents>
<Extend> ::= **actor** <Actor_name>
extend license <License_name>
of actor <Actor_name>
with operations <Operations>
<Limit> ::= **actor** <Actor_name>
limit license <License_name>
of actor <Actor_name>
with operations <Operations>
<Withdraw> ::= **actor** <Actor_name>
withdraw license <License_name>
from actor <Actor_name>

<Grant> ::= **actor** <Actor_name>
{ **grants licensing right** <License>
to actor <Actor_name> |
/∗ or ∗/ |
withdraw license <License_name>
from actor <Actor_name> }

<Actor_name> ::= [**not**] <Identifier>**-set** | **all**
<Operations> ::= [**not**] <Op_name> **-set**| **all**
<License_name> ::= /∗ some identifier ∗/
<Documents> ::= **class** <Doc_Class_name> | <Doc_name>**-set**

Example Licenses

ln1: **actor** a1 **grants operations** {op1,op2,...,opn}
to actor a2 **on documents** {d1,d2,...,dm}

actor a3 **extend license** ln2 **of actor** a4 **with operations** {op′,op″,...,op‴}

actor a5 **limit license** ln3 **of actor** a6 **with operations** {op$a$,op$b$,...,op$w$}

actor a7 **withdraw license** ln4 **from actor** a8

actor a9 **grants licensing right**
ln5: **actor** a10 **grants operations** {opx,opy,...,opz}
to actor a11 **on documents** {da,db,...,dc}

actor a12 **withdraw license** ln6 **from actor** a13

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Special Edit Operations

- We have hinted at only a very rudimentary **edit** operation.
  - ⋆ One that takes only one document and
  - ⋆ basically adds, modifies or deletes **text**.
- More general, in fact a whole family of **edit** operations are present in everyday handling of documents:
  - ⋆ **merge** of two documents into
    - ◇ a third, implying a **copy**ing and a **create** operation.
    - ◇ into one of the two documents, implying a **copy**ing and a simple **edit** operation.
  - ⋆ **split** of one document into two documents implying a copying and two **create** operations.
  - ⋆ *Etcetera*

-761-51-1275, Fax: +81-761-51-1149

E-mail: bjorner@gmail.com; URL: http://www.jaist.ac.jp/~bjorner

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A Document Class Concept

Examples

General Public Administration Document Classes

Different branches of government work on and produce different classes of document:

- Parliamentary committees (PC)
  - ⋆ handle **societal background problem** documents and
  - ⋆ produce **committee discussion** and **law proposal** documents.

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• General Public Administration Document Classes — Continued

- Parliament (P)
  - ⋆ handles **committee discussion** and law proposal documents and
  - ⋆ produces **parliament discussion** and law documents.
- ...
- And law courts
  - ⋆ receive **law suit** documents,
  - ⋆ deliberate over **law court proceeding** documents and
  - ⋆ issue **verdicts** (i.e., documents).

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E-mail: bjorner@gmail.com; URL: http://www.jaist.ac.jp/~bjorner

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Specific Public Administration Documents

• Taxation Document Classes

- A tax office
  - ⋆ issues **tax declaration template** documents and
  - ⋆ handles **tax declaration form**[1] documents.

• Traffic Police Documents

- A traffic police officer
  - ⋆ handles **traffic violation citation template** documents and
  - ⋆ issues **traffic violation citation forms** (i.e., documents).

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[1] A form is a filled-in template document

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• Budget and Account Documents

- An accountant
  - ⋆ handles **budget** documents,
  - ⋆ fills in **account template** and **account form** documents, and
  - ⋆ aggregates (calculate) over **account form** and **budget** documents to produce ...

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2nd Break

- After the break (**topic 2 continued**):
  - ⋆ Document **classes, references, computations** and **attributes**
  - ⋆ Actor **attributes**

  and
- **Topic 3:** $\mathcal{E}^2\mathcal{G}$: **$\mathcal{E}$ssential $\mathcal{E}$-$\mathcal{G}$overnment**

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Document Classes

Generic Document Classes

- By the generic class of documents we understand a class of documents that is indeoendent of the specific application domain.
- We make the following generic classification:
  - ⋆ **General, unformatted, un-structured text documents.**
    Comment: No computations can be done on such documents.
    Example: Any "spur-of-the-moment" note
  - ⋆ **Formatted, semi-structured text documents.**
    Comment: Trivial searches can be done over such documents.
    Example: Most public administration documents.
  - ⋆ **Speficially formatted, template-based document.**
    Comment: Non-trivial compuations can be done over such documents.
    Example: Most application and related documents.

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• Document Classes

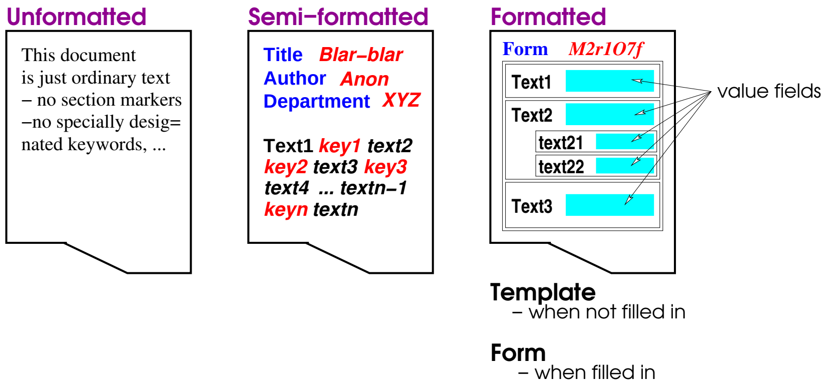

Figure 3.1: **Indication of Document Classes**

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Specific Government Document Classes

- For the application-specific category of public administration
  - ⋆ we suggest to let the class of government documents
  - ⋆ be determined by their relevance to specific laws or law proposals:[2]
- Some specific examples:
  - ⋆ Law proposal background doc.
  - ⋆ Law proposal discussion doc.
  - ⋆ Law.
  - ⋆ Law admin./handling doc.
  - ⋆ Law rules & reg. doc.
  - ⋆ Local admin. letter to citizen.
  - ⋆ Citizen reply to local admin. letter.
  - ⋆ Citizen complaint to law court.
  - ⋆ Law court inquiry doc.
  - ⋆ Law court decision.

[2]— all other documents are simple administration documents found also in most other forms of administration.

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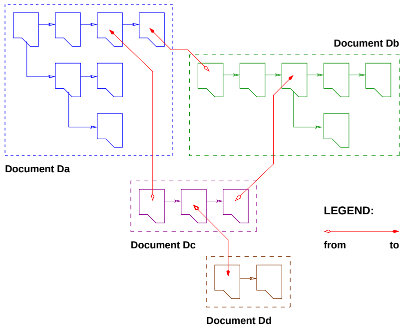
Document [Cross–]References

- Documents
  - ⋆ in one family of documents
  - ⋆ may cross-refer to documents
  - ⋆ in another family of documents

  as shown to the right.
- Reasons seem obvious:
  - ⋆ chronologically "later" documents were
  - ⋆ derived in the context of knowledge of
  - ⋆ the chronologically "earlier" documents
  - ⋆ which can be made aware of the of the "later" uses.



Cross-references between documents of four document families

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• Examples of Document [Cross–]References

- Law proposal background doc. may refer to other laws.
- Law proposal discussion doc. may refer to background doc.
- Law usually refers to many other laws.
- Law admin./handling doc. usually refers to many other handling docs. and refers to the law.
- Law rules & reg. doc. refers to the law.
- Local admin. letter to citizen refers to the law.
- Citizen reply to local admin. letter refers to that letter.
- Citizen complaint to law court refers to local admin. letter and law.
- Law court inquiry doc. refers to citizen and local admin. letters and the law.
- Law court decision refers to the law and other law court decisions.

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Document Computations

- We can distinguish amongst different kinds of computations over documents.
  - ⋆ Document Identifier Searches:
    Example: Intra- and inter–document-family tracing.
  - ⋆ Attribute Searches:
    Example: Searches based on document attributes — incl. form numbers.
  - ⋆ Trivial Document "Syntactic Content" Searches:
    Example: Documents related to a specific agent or topic (a citizen, a law, or other). Searches look for text parts only.
  - ⋆ Non-trivial Document "Semantic Content" Searches:
    Example: Documents containing strongly formatted text parts, e.g., XML embedded and coded texts. Searches try to deduce meaning ("data mining").
  - ⋆ Full-blown Computations:
    Example: Tax computations.

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Summary of Document Attributes

These are the generic classes of document attributes.

- **document name**
- **document version number**
- **document classes** (generic and special)
- **history trace** of operations[a] (operation, location, time, actor)
- **reference to relevant license**

A unique document identifier can be calculated from the above.

Doc. name:
Bjorner–e–macao
Doc. version:
version–number
Doc. class:
(gen–format,seminar)
Doc. history:
<(create,jaist,april30,db),
(edit,jaist,may2,db),
...
(edit,shanghai,may24,db),
(copy,macao,may31,lsc),
(read,macay,june1,...)>
License:
E–mail: Janowski–to–Bjørner

Document attributes

[a] including computations

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Actor Attributes

- **Unique Actor Identifier**
- **Actor Location**
- **Licenses**
  - ⋆ Current "Own" Licenses (i.e., work being pursued)
  - ⋆ Current Granted Licenses (i.e., work being managed)
- Which **Documents** (by rerence)
  - ⋆ have be **Operated** upon
  - ⋆ at **Locations**
  - ⋆ and at **Times**

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Topic 3

$\mathcal{E}^2\mathcal{G}$: $\mathcal{E}$ssential $\mathcal{E}$-$\mathcal{G}$overnment

- **Law**-based public administration handles, like any other public or private administration, "thousands" of kinds of "zillions" of documents.
- Of these we single out now, we focus only on those public government documents
  - ⋆ which are **based in law**,
  - ⋆ which ultimately **refer to laws**.
- That is we **do not** in the following consider such kinds of documents
  - ⋆ as procurement, (ordinary) budget, accounting, personnel, etc.
  - ⋆ documents whose handling is like in any other, not law-based administration, whether public or private.
- **Assumption**: **Paperless administration**!

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The Meaning of $\mathcal{E}^2\mathcal{G}$

- So, by $\mathcal{E}$ssential $\mathcal{E}$-$\mathcal{G}$overnment we shall thus mean:
  - ⋆ Any electronic handling of documents, that is,
    - ◇ **planning,**
    - ◇ **preparation,**
    - ◇ **discussion,**
    - ◇ **communication,**
    - ◇ **decision,**
    - ◇ **etcetera**

    and which are based on and results in (possibly new, possibly edited) documents
  - ⋆ **such that these documents**
  - ⋆ **directly or indirectly**
  - ⋆ **refer to laws.**

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From Domain to $\mathcal{E}^2\mathcal{G}$ Requirements

- To illustrate what "such electronic handling" might mean,
- we **systematically go through** the domain(s)
  - ⋆ of public government such as outlined in topic 1
  - ⋆ and of documents, such as outlined in topic 2
- in order to **decide** whether "such–and–such"
  - ⋆ agent (institution, i.e., branch of government) and citizen interactions,
  - ⋆ documents and document attributes,
  - ⋆ functionalities,
  - ⋆ "etcetera"
- **must** be **"made more–or–less electronic"**.

-761-51-1275, Fax: +81-761-51-1149

E-mail: bjorner@gmail.com; URL: http://www.jaist.ac.jp/~bjorner

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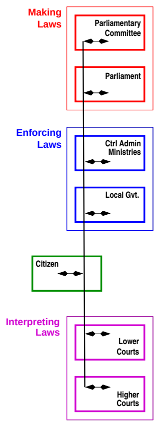
So Here We Go: Towards $\mathcal{E}^2\mathcal{G}$

Which branches of government should be included in $\mathcal{E}^2\mathcal{G}$?

- One answer could be:
  - ⋆ All branches interfacing with citizens.
  - ⋆ The double–arrowed line indicates this.
  - ⋆ Within these branches we must list the relevant departments.
- Another answer could be: Only such and such a subset of the indicated branches. (We then omit some of the ↔s.)



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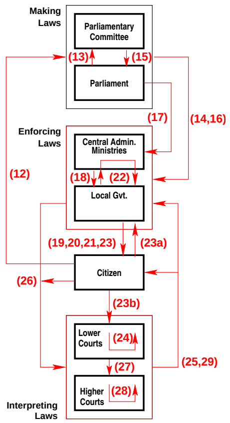
Which document classes should be included in $\mathcal{E}^2\mathcal{G}$?

- One answer could be:
  - ⋆ All the (in this example) **29** document classes implied by the **red** arrows in figure to the right.
  - ⋆ For each arrow-head we then list relevant document classes.
- Another answer could be: Only such and such a subset of the indicated document classes.

  (That is, we omit some of the → document classes.)



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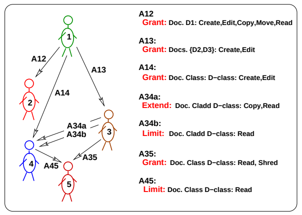
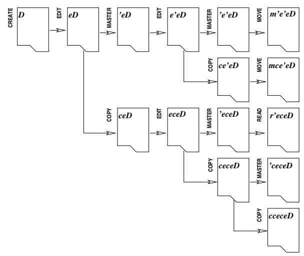
Which authorisation on document classes should be $\mathcal{E}^2\mathcal{G}$ scripted?

- For each selected document class
  - ⋆ scripts
  - ⋆ of zero, one or more authorisations need be designed
  - ⋆ and their instantiation wrt. specific documents
  - ⋆ must be computerised,
  - ⋆ as must the monitoring and control of the implied document family.





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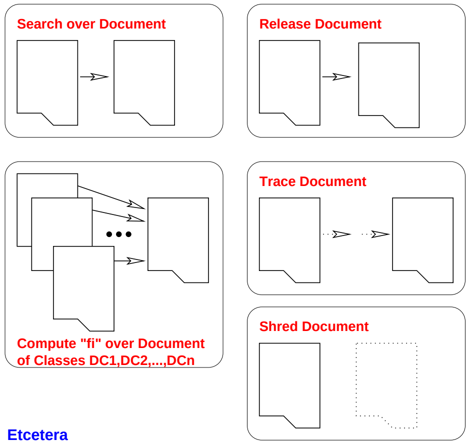
Which new operations document classes should be $\mathcal{E}^2\mathcal{G}$ supported?

- For each selected document class
- as well as combinations of related document classes
- all conceivably $\mathcal{E}^2\mathcal{G}$ supported operations must be defined:
  - ⋆ All relevant **searches**.
  - ⋆ All relevant $n \geq 1$ **computations**.
  - ⋆ All **trace** functions.
  - ⋆ A new **release** operation.
  - ⋆ The **shred** operation.



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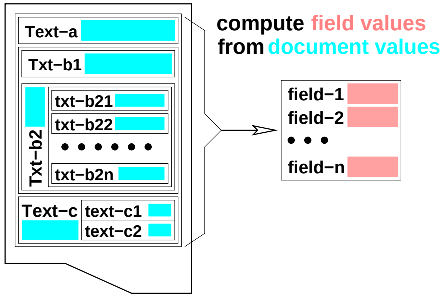
• More on $\mathcal{E}^2\mathcal{G}$ Document Computations (II)

- One class of computations
  - ⋆ have the compuation be based on **value**s
  - ⋆ of a possibly only partially **filled-in template** (= **form**).
  - ⋆ The computation would then yield, not necessarily a document, but
  - ⋆ new values that can serve as basis for further computations
  - ⋆ and possibly be fed to a repository of documents.
- Such computations
  - ⋆ presume design of templates (i.e., forms),
  - ⋆ and the implementation of the computations.



(Partially) Filled Template Form

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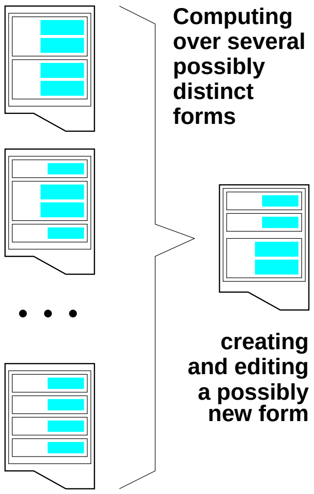
• Yet More on $\mathcal{E}^2\mathcal{G}$ Document Computations (III)

- Another class of computations
  - ⋆ collects data from several possibly distinct documents
  - ⋆ and produce an aggretated document.
- An example could be
  - ⋆ income and property tax returns
  - ⋆ of several tax payers
  - ⋆ aggregated into a community tax budget.
- The leftmost, i.e., the resulting document may be an edited (i.e., an update) version of one of the rightmost, i.e., input documents.



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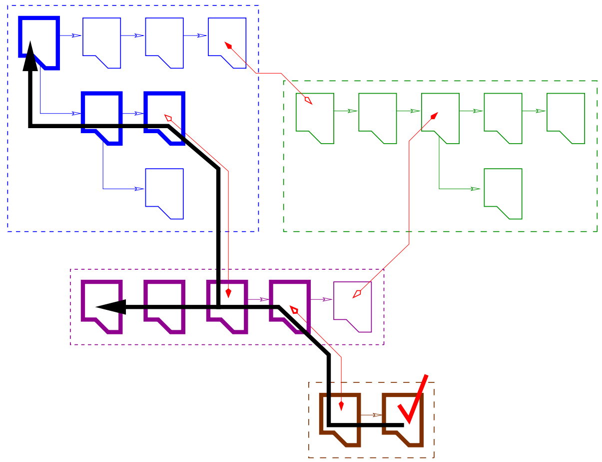
Transparency Implies $\mathcal{E}^2\mathcal{G}$ Traceability

- Given a document,
  - ⋆ say the "bottom-right-most" **√-checked** document
  - ⋆ one may wish to trace all its "ancestor" documents.
  - ⋆ Such a trace may — as indicated — lead
  - ⋆ to several traces, that is,
  - ⋆ to sequences of document references.
- For an agent or a citizen such **traceability**
- implies **transparency** of public government.

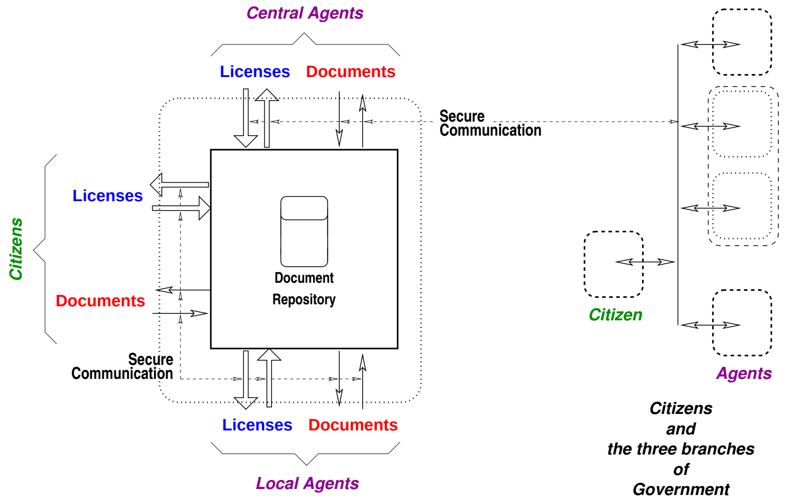


Summary of $\mathcal{E}^2\mathcal{G}$

First Summary

- So $\mathcal{E}$ssential $\mathcal{E}$-$\mathcal{G}$overnment, $\mathcal{E}^2\mathcal{G}$,
  - ⋆ assumes **paper-less** administration, i.e., all electronic documents and
  - ⋆ focuses of all/most such **document**-manifested actions
  - ⋆ which are **based in law**.
- Such documents entail:
  - ⋆ Which **branches** of public government are **included/excluded**?
  - ⋆ Which **document classes** are **included/excluded**?
  - ⋆ Which **authorisations**, and which **scripts** are **mandated**?
  - ⋆ Which **operations** on documents are **supported**?
  - ⋆ Which form of **traceability** is **supported**?

Second Summary of $\mathcal{E}^2\mathcal{G}$



Topic 4

Closing

What Have We Covered?

- Three branches of government $\leftrightarrow$ citizens
- Flow of documents
- Actors: citizens and agents
- Documents
  - ⋆ create, edit, copy, move, read, shred, search, compute
  - ⋆ document version, history, reference, trace
  - ⋆ authorisation, license
- $\mathcal{E}^2\mathcal{G}$: $\mathcal{E}$ssential $\mathcal{E}$-$\mathcal{G}$overnment

What Did We Try to Achieve?

- A systematic approach to understanding the **domain** of public government.
- Another approach to asking for $\mathcal{E}^2$-$\mathcal{G}$overnment.
- A focus of **law-based documents**
- A view of **good governance**:
  - ⋆ **Transparency of document handling**
  - ⋆ **Transparency of the 'Rule of Law'**

THANKS