FIG International Seminar
e-Land Administration

Legal issues in future e-conveyancing in NL - W. Louwman
E-conveyancing using Public Key Instrastructures in NL - P.A. Stolk

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Applications of *e*-Land Administration

Transfer of real estate objects

Legal system = deed-based system

Public Registers:

- **copies of deeds published in full**
- **signed by civil law notary**
- **have to remain available to inquire**
- **2003: total of 1.040.000 deeds**

Land Register:

- **listing rights and names of title holders and index figures**
- **updated daily by 500 employees in 15 branch offices**
- **point of access to public registers**

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Digitalisation of Public Registers

History:

- deeds kept in paper form since 1832
- replaced by microfilm since 1960
- deeds from 1999 are scanned
- still on microfilm as backup

Benefits of scanned deeds:

- work flow management: distributing work over 15 offices
- peak periods -> peak period pools

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Digitalisation of Public Registers

Looking into digital deeds:

- available by Kadaster-on-line
- scanning-on-demand (deeds <1999); by use of reader-scanners, scanning from microfilm

Digital deeds are images

After changing Kadaster Act, electronic copies (text)

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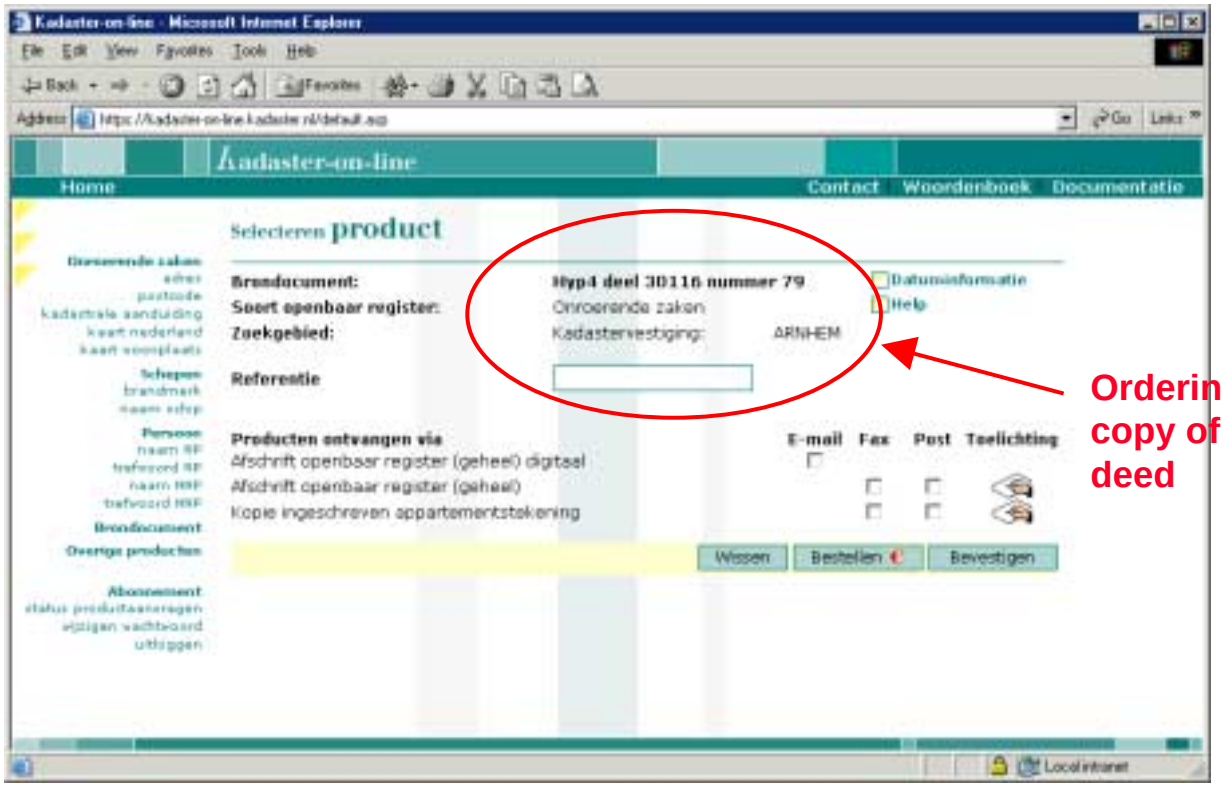

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Electronic Registration

European directive:

- paper-based legal transaction = electronic legal transaction
- licence system not allowed!

Authentication of electronic documents:

- digital signature by asymmetric encryption
- issuing certificates?

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To become electronic presenter

Registration as presenter of digital deeds

- exchange protocol is published by the registrar (for application developers)
- stating the application to use by the prospective presenter
- stating the certificate service provider (csp) by the prospective presenter
- stating possibility of suspension by the registrar
- acceptance by the registrar

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Computerisation of recording of deeds and updating of the Land Registry

Opportunities of e-conveyancing

- fully computerised or semi-computerised?
- use of electronic forms, to be downloaded
- checking on registration requirements
- updating the land registry

Staffing-related consequences

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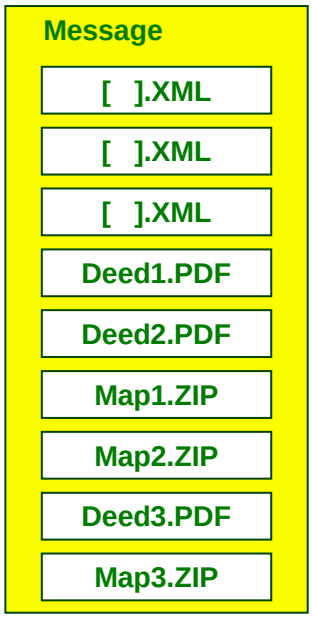

Mail Based System

- **Incoming and outward messages consist of:**
  - **XML forms**
  - **file names of deeds and maps are mentioned in these forms**
  - **signed deeds, annexes, evidences and maps**
  - **large files could be compressed (ZIP)**

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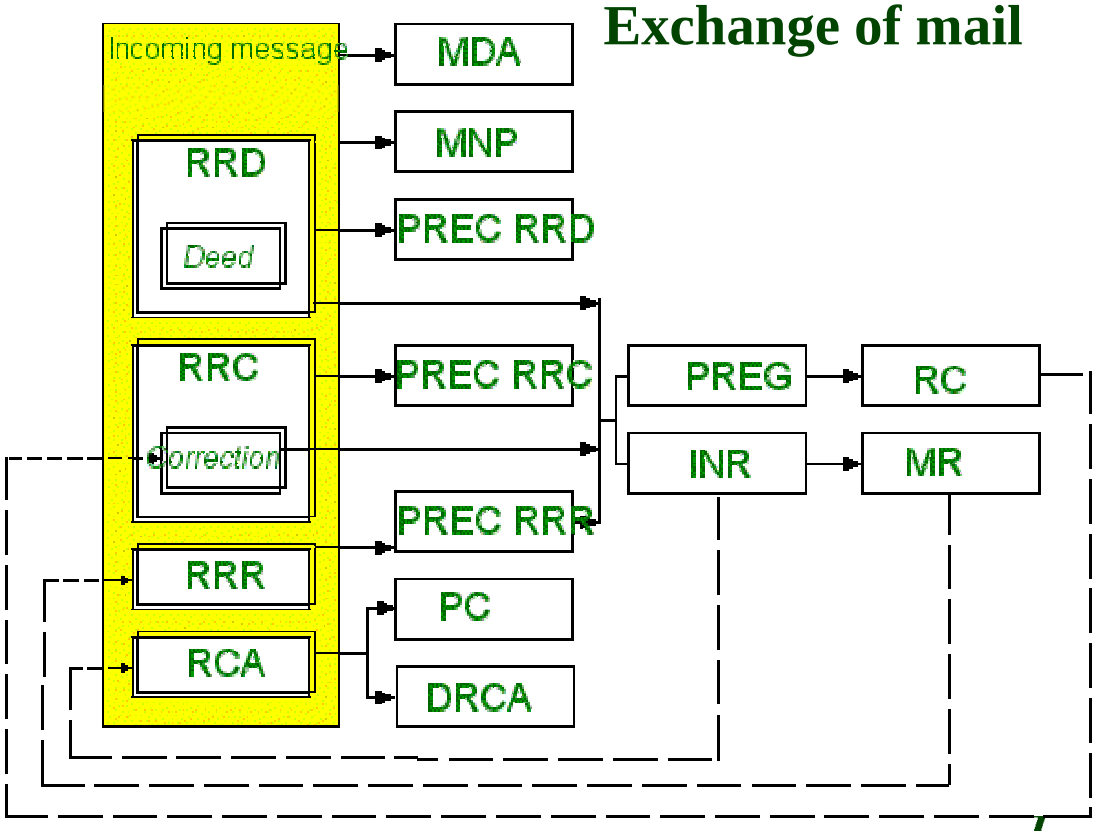
Exchange of mail



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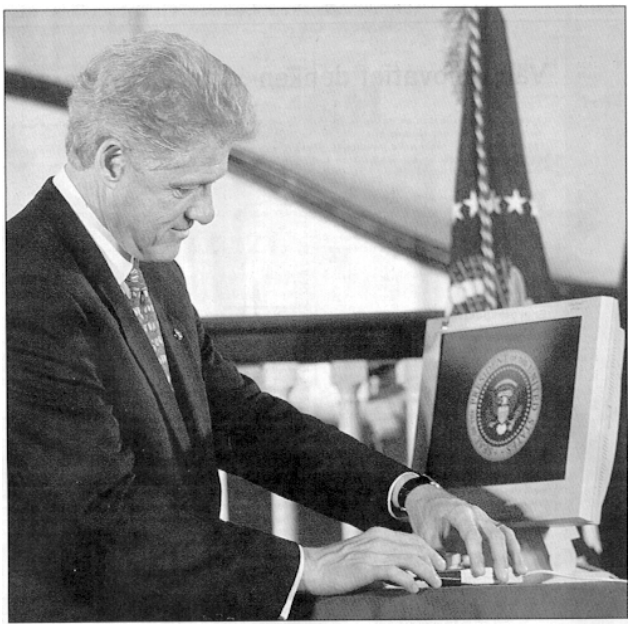

Digital signatures:

- **equalization of digital and conventional signatures in legislation**
- **almost allways by use of an encrypted message digest**
- **signing by smartcard or crypto-server**
- **'public key infrastructure (pki)'**

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Ingredients for Digital Signatures

- **Aymmetric cryptography**
- **Use of Hashing algorithms**
- **Certificates**
- **Trusted Third Party**

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A=D

B=E

C=F

D=G

KADASTER -> NDGDVWHU

Cryptography:

- **symmetric:**
  - **Caesar's algorithm**
  - **third one following in alphabet**
- **asymmetric:**
  - **algorithm of Rivest, Shamir and Adelman (RSA)**
  - **use of private and public key**

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Hashing techniques

- **Message Digest 5 (MD5)**
- **Secure Hashing Algorithm - 1 (SHA-1)**

```
MD5(There is $1500 in the blue box.) = 05f8cfc03f4e58cbee731aa4a14b3f03
MD5(There is $1100 in the blue box.) = d6dee11aae89661a45eb9d21e30d34cb
MD5(The meeting last week was swell.)= 050f3905211cddf36107ffc361c23e3d
```

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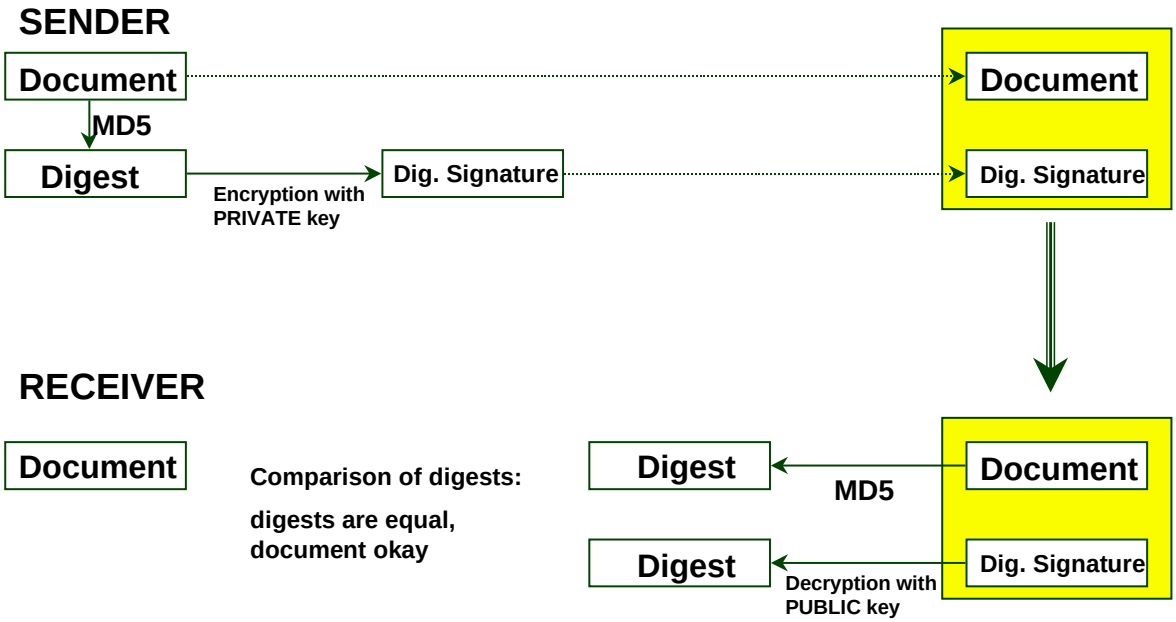
Schematic presentation of asymmetric cryptography



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Certificates

- Issued by Trusted Third Parties or Certificate Service Providers
- X509v3
- Certificate Revocation List (CRL) or Online Certificate Status Protocol (OCSP)

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Smart card (reader):

- **personally bound**
- **signing individual documents**

Crypto server:

- **bound to an organization or function**
- **bulk signing of documents**
- **based on Hardware Security Module**
- **provides on-board secure key storage, key generation and key management functions**
- **tamper proof**

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Presenters of deeds:

- **Profession of notary (>98%)**
- **Bailiff (presenter of seizures)**
- **Bailiff of internal revenue service**
- **Municipalities**
- **Provinces**
- **Water mngt authority**

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Idea of presenting a web application

Issues:

- Access to local file system?
- Digital signature?
- Not installing software on presenter's computer
- No responsibility for local software

- Proof of Concept

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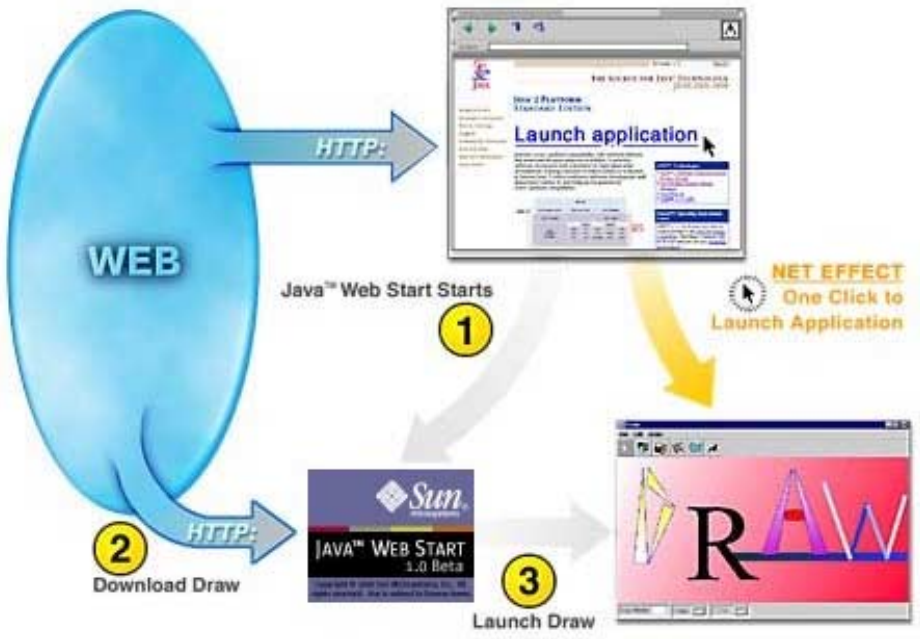
Based on Java Web Start and PKCS#11



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Security issues:

- **Prescribing smart card reader (USB)**
- **Use of PIN code**
- **Smart cards from known Certificate Service Provider**
- **Following exchange protocol**
- **Signed web application**
- **On first use explicit permission on accessing local file system and smart card reader**
- **Requirements includes use of O.S. and MS Internet Explorer**
- **DEMO!**

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