Total Information Governance

Trading Old Risks for New Ones?

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IG

IG methodologies

IM

Basel II

Privacy regulation

MOReq2

MIKE 2.0

OECD CG principles

IQ

FRCP

SOX

HL 7

ERM

HIIPA

GDPdU

I-Stewardship

E-discovery

A lot of work on conceptual levels has been done and supporting technology is there.

Thesis of this talk: Some fundamental issues of information security, i.e., Confidentiality, Integrity and Availability, are either overlooked or tacitly assumed. Though these are problems in the small, they pose considerable risk, as the weakest link determines overall security

A few inventions, designing IC&T (security) keeping the information value of data in mind, can resolve many of these issues in a cost-efficient way

Some (anecdotic) 'evidence'

- **Jan 2008: Incident at Société Générale**
  - **Broker J. Kervier manipulated DAX futures and sunk 7.2bn US$**
  - **Direct cause was insufficient separation of duties, perhaps due to lack of human resources, and**
  - **Password-based AC**
  - **More governance, finer granularity of access control?**
  - **ITSec: The issue is rather the lack of personal identification in authentication**

Fraude à la Société Générale: le courtier "n'a pas pris la fuite"

Par La rédaction du Post , le 25/01/2008

C'est ce qu'a indiqué son avocate, alors qu'une plainte a été déposée contre cet homme de 31 ans, suspecté d'avoir fait perdre 5 milliards d'euros à la Société Générale.

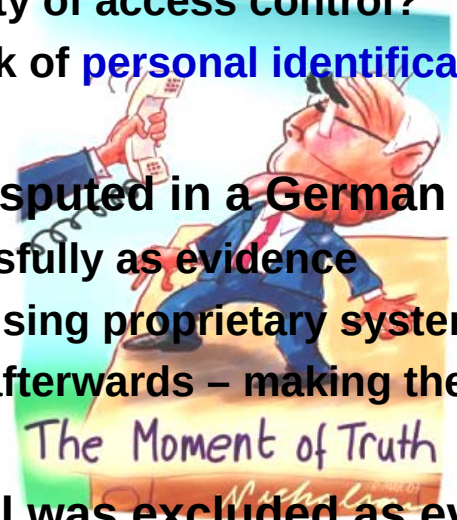
Jérôme Kerviel

Son avocate Me Elisabeth Meyer a indiqué que son client "n'a pas pris la fuite". "Je ne sais pas où il est", a déclaré le PDG de SG Daniel Bouton, qui n'avait pas communiqué son identité.

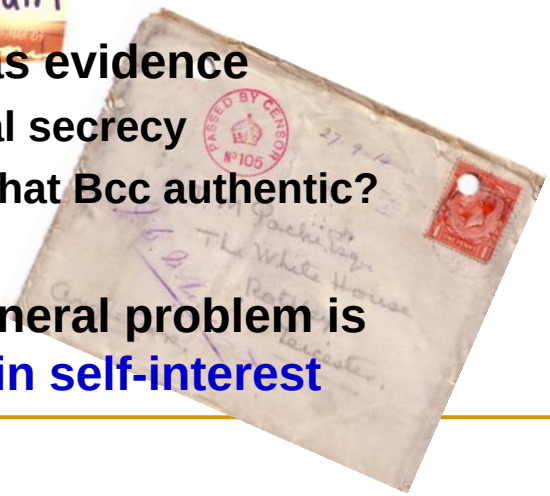
Comment aurait-il fait pour faire perdre une telle somme d'argent à la Société Générale ?

"Agé de 31 ans, le courtier qui se nomme Jérôme Kerviel, a construit, seul, "depuis son poste de travail, une entreprise dissimulée à l'intérieur de nos salles de marché", a expliqué M. Bouton, lors d'une conférence de presse, en présentant ses "excuses" aux actionnaires.

- **Mid 2007: A B2C contract was disputed in a German court**
  - **VoIP recording was used successfully as evidence**
  - **Call recorded by the call-centre using proprietary systems (Cisco)**
  - **The call was leaked on the Web afterwards – making the customer look stupid**



- **2007: In a patent litigation, e-mail was excluded as evidence**
  - **Bcc to legal counsel triggers CP rule of professional secrecy**
  - **As the e-mail was archived by the stakeholder – is that Bcc authentic?**

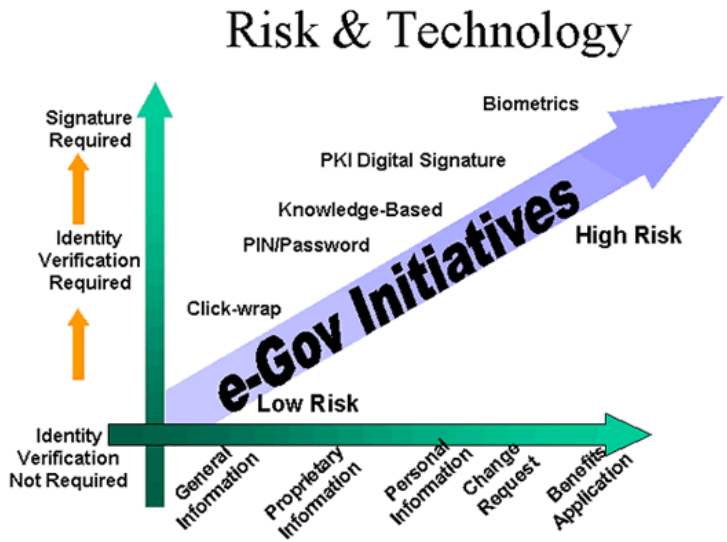


- **Maybe not universally valid examples, but the general problem is probative force and integrity of information kept in self-interest**

Cartoon by Nicholson from "The Australian" newspaper:
www.nicholsoncartoons.com.au

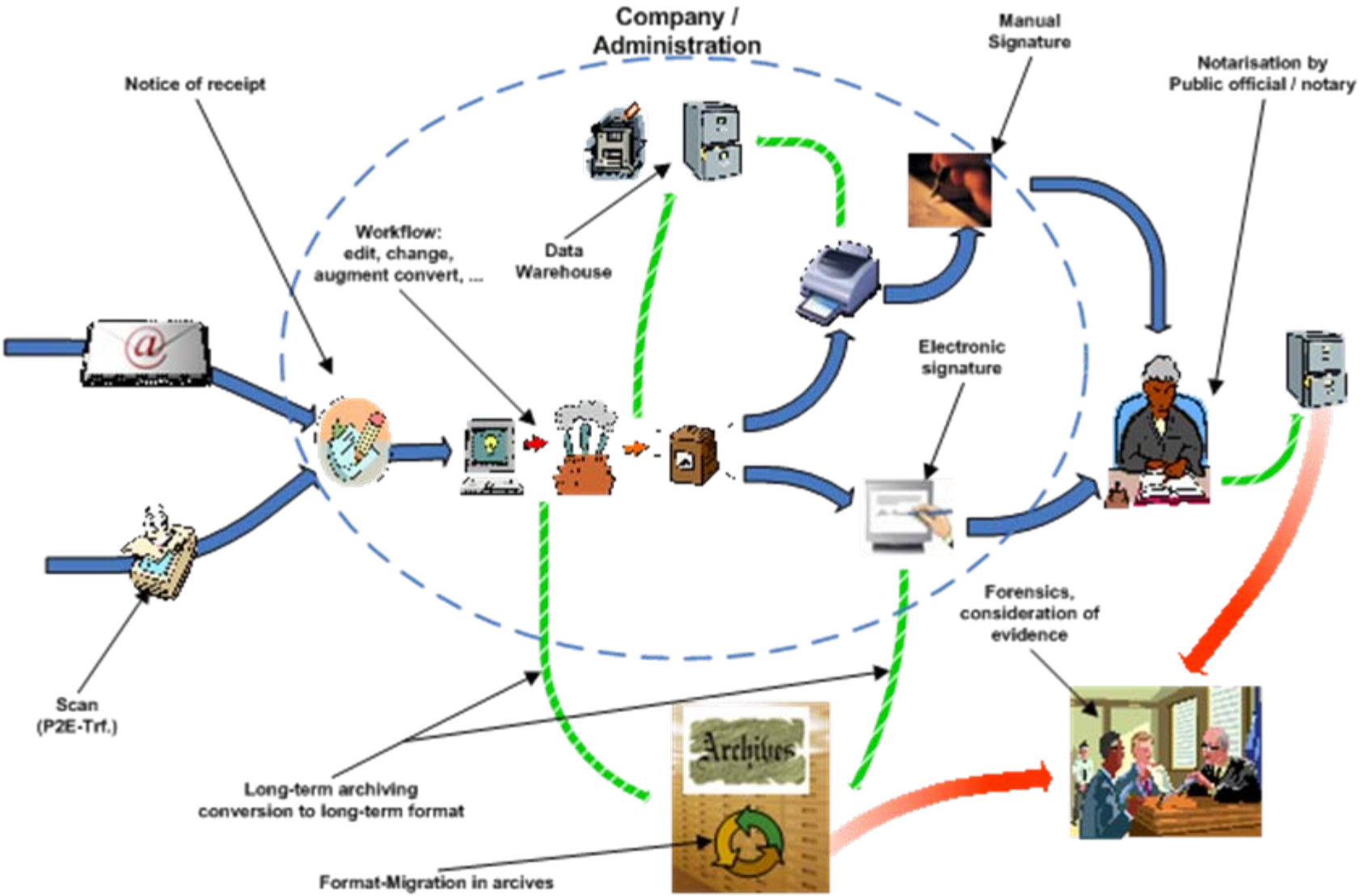
The Commonplace Panacea: Electronic Signatures

- **Fundamental issues**
  - **Long-term probative force of signed information**
    - **Signatures 'wear out' – algorithm strength, key length, … Practical solutions by re-signing, time-stamps and hash-trees**
    - **Data formats become obsolete, migration breaks signatures – Means for legally secure transformations are needed**
  - **What You See Is What You Sign (?)**
  - **Trust in signing systems**



- **Application-level issues**
  - **Enable scaled application of digital signatures**
    - **According to varying IG & security requirements apply anything from digest values over simple digital signatures with or w/o PKI, up to qualified electronic signatures**
  - **Enable convergence**
    - **Find analogues for electronic signatures for other media than documents (VoIP, multi-media)**
    - **Integrate signature-based information security (document-centric) with communication security**

Document „Transformations“ in Workflows



TransiDoc – Establishing 'Seals' for Transformations

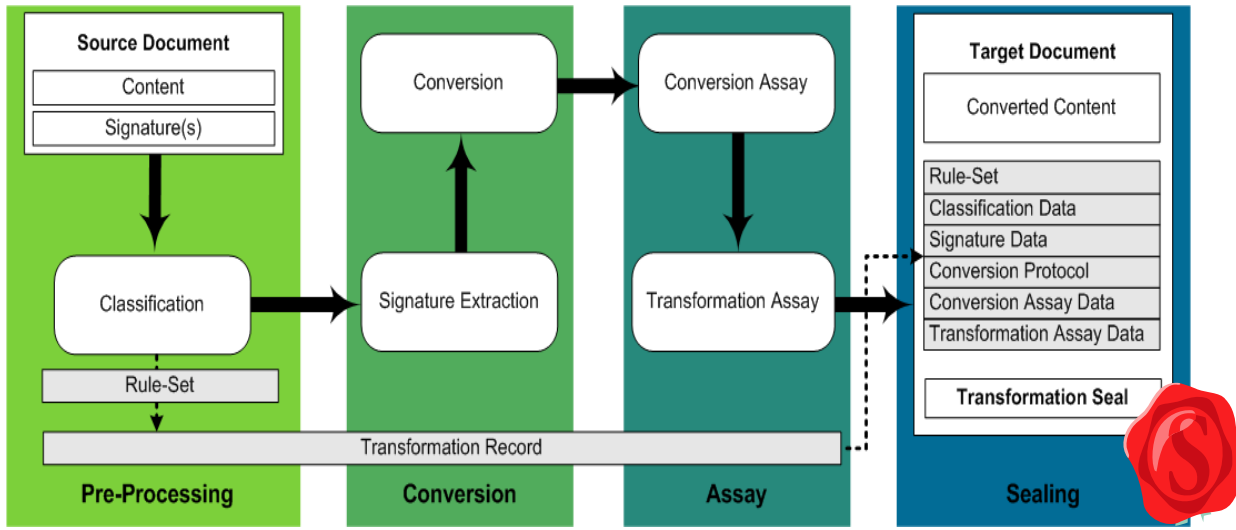
A transformation seal guarantees the properties of a ‚legally secure' transformation. It enables

- **Ex-post assessment of the transformation process**
- **That contents remain the same resp. Are changed just as desired**
- **Assignment to a responsible (transforming) entity, e.g. a scanner or a notary by digital/electronic signature**
- **Usage of the traget document as evidence in place of, and without, the original one**

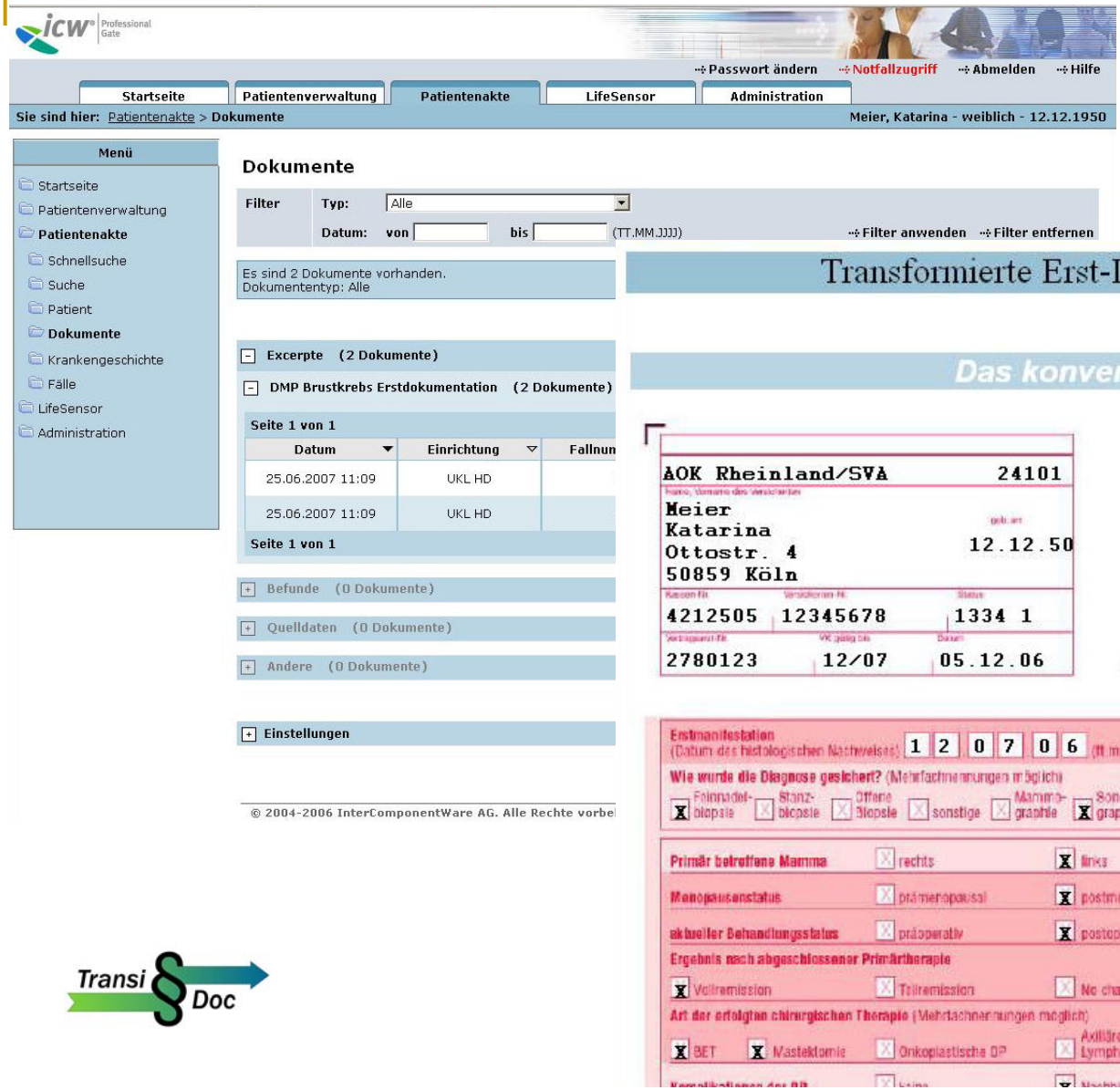
TransiDoc is ultimately a collection of structured XML schemata, which allow profiling for any application domain

The seal refers to

- **Converted content**
- **Transformation report**
- **Transformation notice, e.g. notarisation**



TransiDoc Application – Patient Records



Transformierte Erst-Dokumentation-Brustkrebs

Das konvertierte Dokument

AOK Rheinland/SVA 24101
Meier
Katarina
Ottostr. 4
50859 Köln
12.12.50
4212505 12345678 1334 1
2780123 12/07 05.12.06

021H

Erst-Dokumentation Brustkrebs

Blatt 1
Original für die Datenannahmestelle

DMP-Fallnummer 1 2 3 4 5 6 7

Krankenhaus-IK

Arztstempel (siehe auch auf Blatt 2 und 3)
Le Medicin
Dr. med. Paul
Am Plötzberg 1
69019 Heidelberg

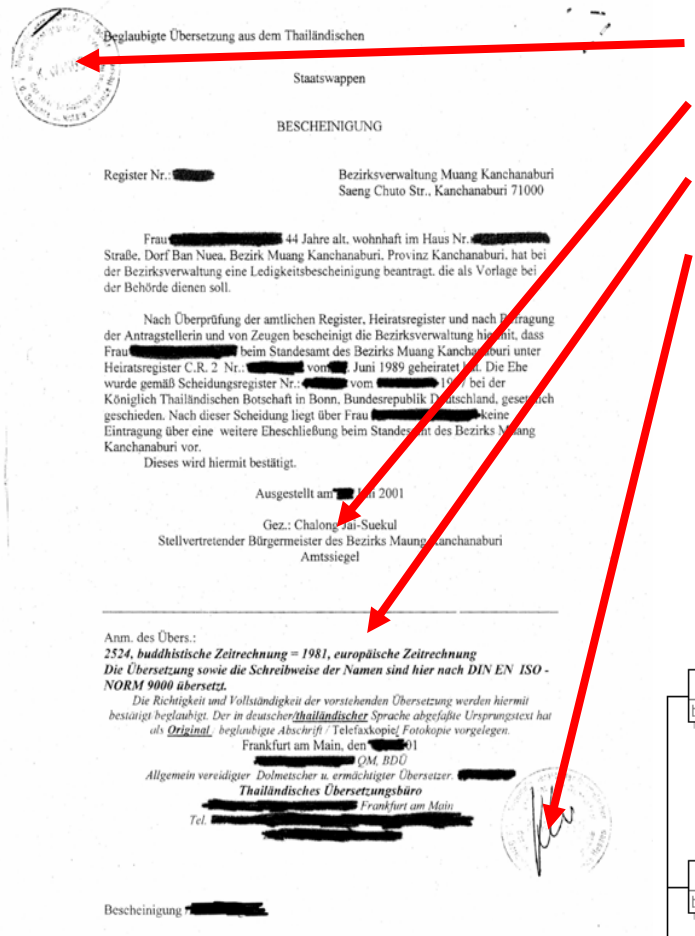
Erstmanifestation (Datum des histologischen Nachweises) 1 2 0 7 0 6 (tt.mm.jj)
Wie wurde die Diagnose gesichert? (Mehrfachnennungen möglich)
[X] Feinnadelbiopsie [ ] Stanzbiopsie [ ] Offene Biopsie [ ] sonstige [ ] Mammographie [X] Sonographie

Lokalrezidiv (Datum des histologischen Nachweises) (tt.mm.jj)
Fernmetastasen gesichert am 0 5 1 2 0 6 (tt.mm.jj)

Primär betroffene Mamma: [ ] rechts [X] links [ ] beidseitig
Menopausenstatus: [ ] prämenopausal [X] postmenopausal
aktueller Behandlungsstatus: [ ] präoperativ [X] postoperativ [ ] adjuvante Therapie [ ] Nachsorge [ ] derzeit kein operatives Vorgehen geplant
Ergebnis nach abgeschlossener Primärtherapie: [X] Vollremission [ ] Teilremission [ ] No change [ ] Progress [ ] Therapie noch nicht abgeschlossen
Art der erfolgten chirurgischen Therapie (Mehrfachnennungen möglich): [X] BET [X] Mastektomie [ ] Onkoplastische OP [ ] Axilläre Lymphonodektomie [ ] anderes Vorgehen [ ] kein operatives Vorgehen

TransiDoc

TransiDoc Application – Authorised Translations



Beglaubigte Übersetzung aus dem Thailändischen

Staatswappen

BESCHEINIGUNG

Register Nr.: [redacted] Bezirksverwaltung Muang Kanchanaburi
Saeng Chuto Str., Kanchanaburi 71000

Frau [redacted] 44 Jahre alt, wohnhaft im Haus Nr. [redacted] Straße, Dorf Ban Nuea, Bezirk Muang Kanchanaburi, Provinz Kanchanaburi, hat bei der Bezirksverwaltung eine Ledigkeitsbescheinigung beantragt, die als Vorlage bei der Behörde dienen soll.

Nach Überprüfung der amtlichen Register, Heiratsregister und nach Befragung der Antragstellerin und von Zeugen bescheinigt die Bezirksverwaltung hiermit, dass Frau [redacted] beim Standesamt des Bezirks Muang Kanchanaburi unter Heiratsregister C.R. 2 Nr.: [redacted] vom [redacted]. Juni 1989 geheiratet hat. Die Ehe wurde gemäß Scheidungsregister Nr.: [redacted] vom [redacted] 1997 bei der Königlich Thailändischen Botschaft in Bonn, Bundesrepublik Deutschland, gesetzlich geschieden. Nach dieser Scheidung liegt über Frau [redacted] keine Eintragung über eine weitere Eheschließung beim Standesamt des Bezirks Muang Kanchanaburi vor.
Dieses wird hiermit bestätigt.

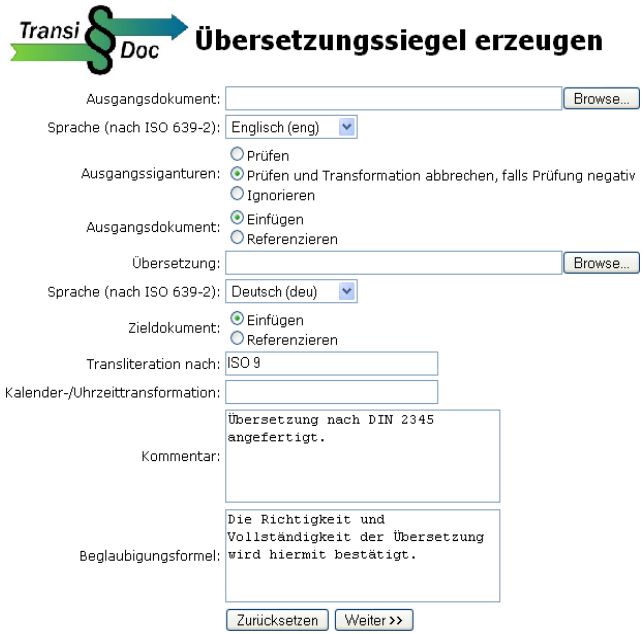
Ausgestellt am [redacted] 2001

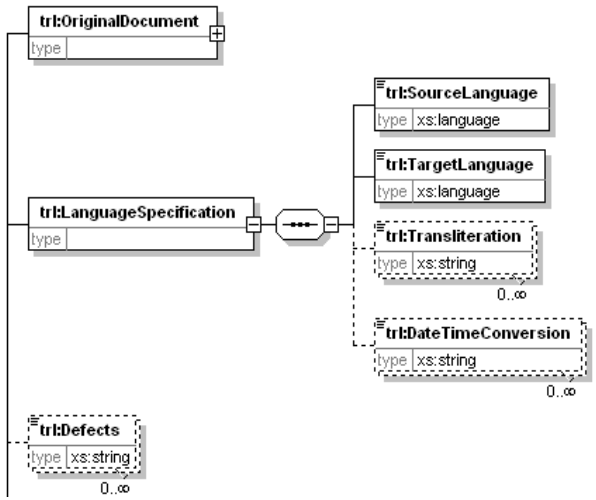
Gez.: Chalong Jai-Suekul
Stellvertretender Bürgermeister des Bezirks Muang Kanchanaburi
Amtssiegel

Anm. des Übers.:
2524, buddhistische Zeitrechnung = 1981, europäische Zeitrechnung
Die Übersetzung sowie die Schreibweise der Namen sind hier nach DIN EN ISO - NORM 9000 übersetzt.
Die Richtigkeit und Vollständigkeit der vorstehenden Übersetzung werden hiermit bestätigt beglaubigt. Der in deutscher/thailändischer Sprache abgefaßte Ursprungstext hat als Original beglaubigte Abschrift / Telefaxkopie/ Fotokopie vorgelegen.
Frankfurt am Main, den [redacted]01
[redacted] QM, BDÜ
Allgemein vereidigter Dolmetscher u. ermächtigter Übersetzer. [redacted]
Thailändisches Übersetzungsbüro
[redacted] *Frankfurt am Main*
Tel. [redacted]

Bescheinigung [redacted]

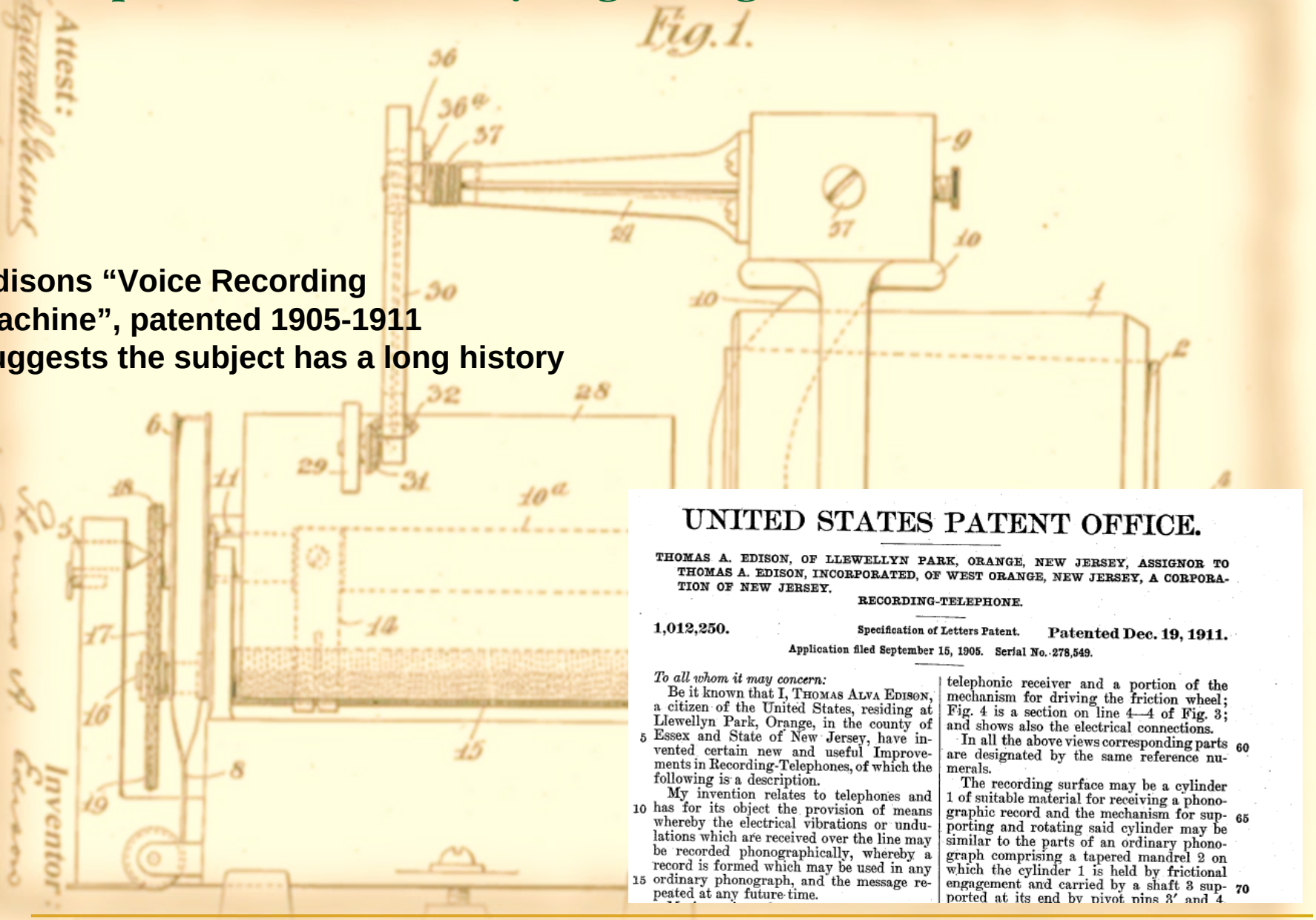
- **Source & traget bound by seal & staple**
- **Description of handwritten signatures**
- **Translator‘s notice**
- **Translator’s signature and seal**





Non-repudiation of VoIP by Digital Signatures - VoIPS

Edisons "Voice Recording Machine", patented 1905-1911 suggests the subject has a long history



UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, ORANGE, NEW JERSEY, ASSIGNOR TO THOMAS A. EDISON, INCORPORATED, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

RECORDING-TELEPHONE.

1,012,250. Specification of Letters Patent. Patented Dec. 19, 1911.

Application filed September 15, 1905. Serial No. 278,549.

To all whom it may concern:

Be it known that I, THOMAS ALVA EDISON, a citizen of the United States, residing at Llewellyn Park, Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Recording-Telephones, of which the following is a description.

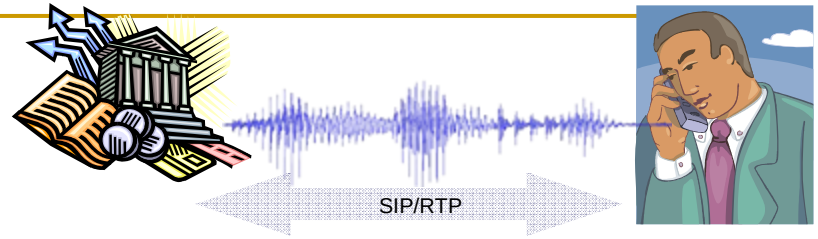
My invention relates to telephones and has for its object the provision of means whereby the electrical vibrations or undulations which are received over the line may be recorded phonographically, whereby a record is formed which may be used in any ordinary phonograph, and the message repeated at any future time.

telephonic receiver and a portion of the mechanism for driving the friction wheel; Fig. 4 is a section on line 4—4 of Fig. 3; and shows also the electrical connections.

In all the above views corresponding parts are designated by the same reference numerals.

The recording surface may be a cylinder 1 of suitable material for receiving a phonographic record and the mechanism for supporting and rotating said cylinder may be similar to the parts of an ordinary phonograph comprising a tapered mandrel 2 on which the cylinder 1 is held by frictional engagement and carried by a shaft 3 supported at its end by pivot pins 3′ and 4

VoIP Security



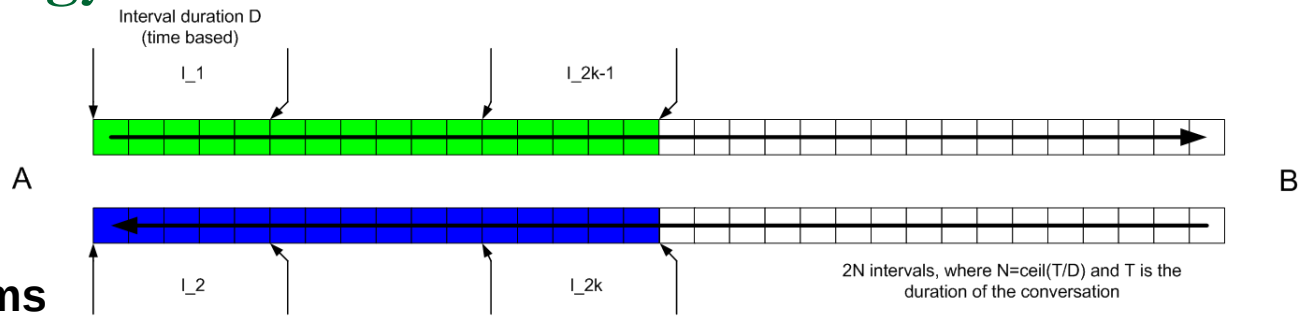
- Basic issues are tackled
  - Protocols like SRTP can provide end-to-end security to phone calls, making them independent from the security of the transport medium. SPIT and DoS are future threats
  - Spam over Internet Telephony (SPIT) considered a major threat – approaches are Gatekeepers, CAPTCHAs, IDS, …
  - ITU Recommendations for Secure Telecommunications

- „Application-level security?“
  - Verbal communication is traditionally bestowed with a high level of trustworthiness
  - Is the integrity of VoIP communication as high as the inter-personal character of conversations suggests?
  - Recent court cases suggest there might be a problem

- Goal: Non-repudiation of conversations by caller and callee, for speech over packet-oriented, digital channels, and in particular for VoIP conversations
  - Providing tenable evidence of
  - Contents of a call
  - Identity of caller and callee
  - Ancillary information (forensic), time & date, …

- For electronic documents, this is usually done by electronic signatures

VoIPS Core Technology



- **Electronic signatures over packet-oriented, time-based data streams**

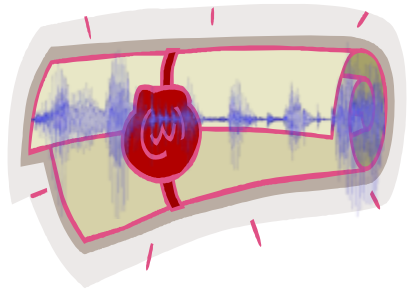
- **Methods**
  - **Separation into intervals consisting of an adjustable number of packets**
  - **Chaining by hash values**
  - **Securing by digital signatures**
  - **Accommodating for packet loss by specific protocols**
  - **Temporal contaxt by time stamps**

A signs a conversation with B, assuming no packet loss

$$\mathrm{Sec}_I: M_I \stackrel{\mathrm{def}}{=} (D, \mathrm{SIP_Data}, \mathrm{Auth_Data}, \mathrm{nonce}, \ldots) \longrightarrow B;$$
$$S_0 \stackrel{\mathrm{def}}{=} ((M_I)_A)_{TS} \longrightarrow B;$$
$$\mathrm{Sec}_l: S_l \stackrel{\mathrm{def}}{=} (I_l\ S_{l-1})_A \longrightarrow B; \quad l = 1, \ldots, 2N$$
$$\mathrm{Sec}_F: M_F \stackrel{\mathrm{def}}{=} (\mathrm{termination_condition}, \ldots) \longrightarrow B;$$
$$S_F \stackrel{\mathrm{def}}{=} ((M_F, S_{2N})_A)_{TS} \longrightarrow B;$$

$(\cdot)_X \stackrel{\mathrm{def}}{=} \mathrm{Priv}_X(h(\cdot))$

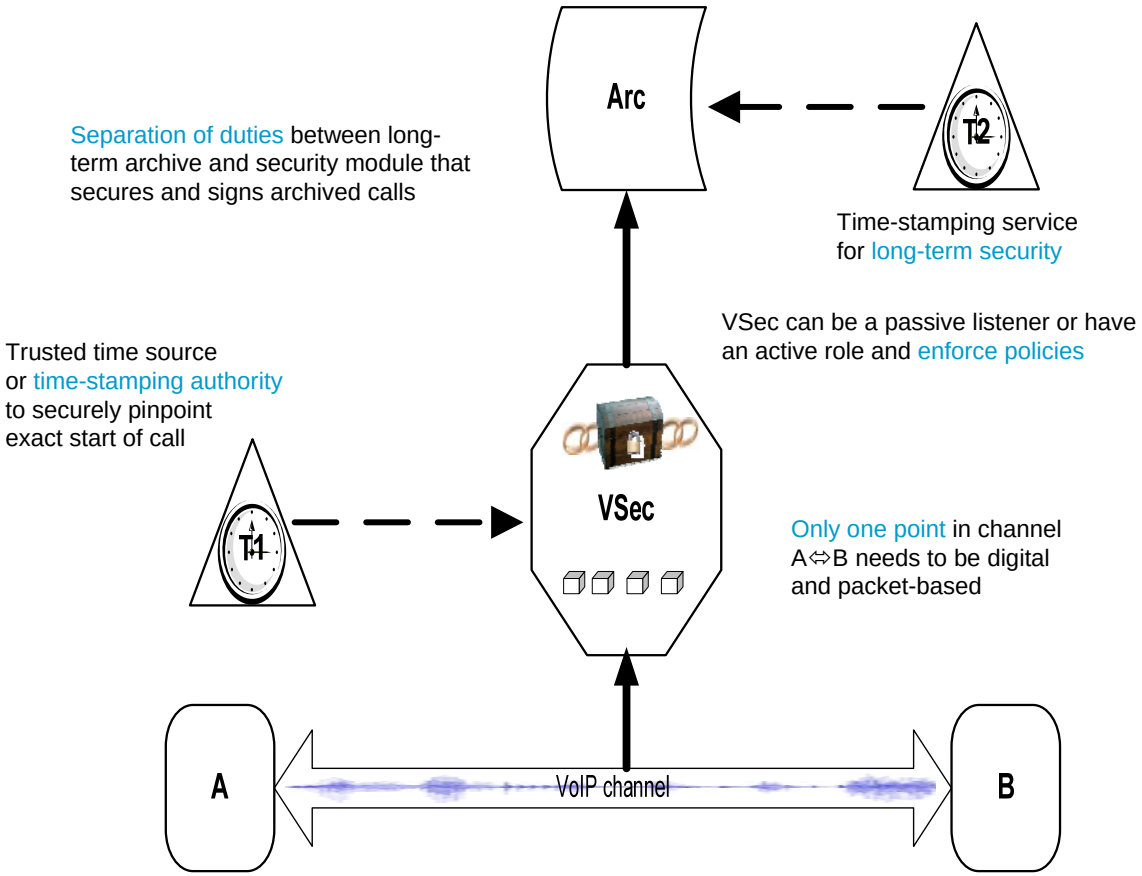
Denotes the signing of data by entity X

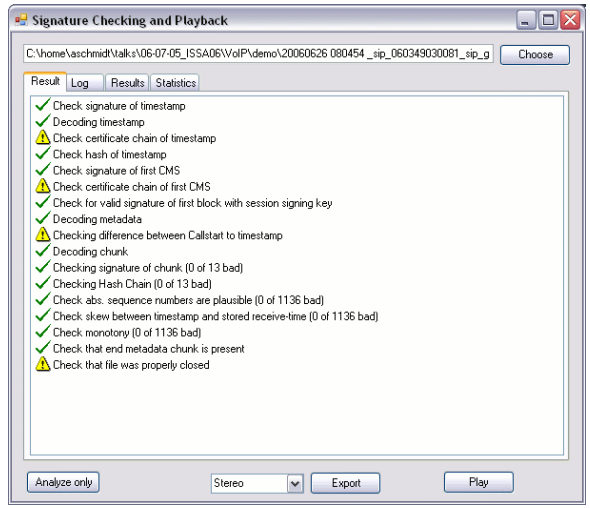


- **Properties**
  - **Signature is formed during call**
  - **bi-directional, time-based nature of communication is taken into account**
  - **time-sequence is secured**
  - **“What is Heard is What is Signed”**

- **VoIPS is patented**

Application: Self-signed VoIP Archive



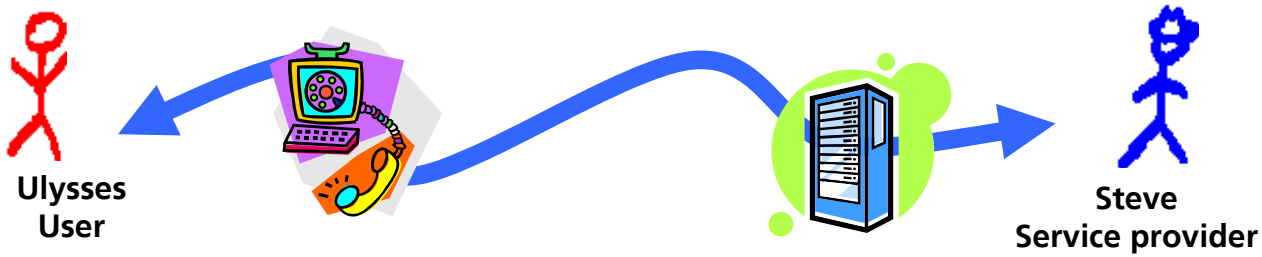


Main Benefit: high accountability by separation of duties and resulting administrator security
Complete audit trail for digital voice communication

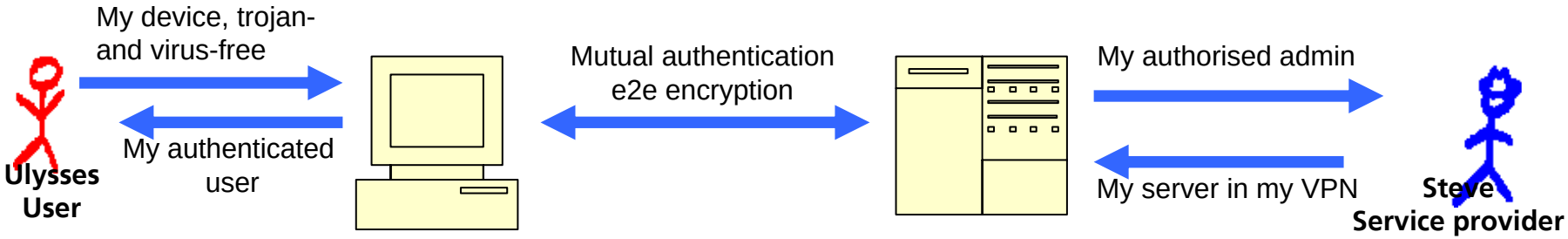
Plan: show a prototype of integrated e-mail and VoIP archive with partners

Trust is chained (more often than not)

- How do partners put trust in each other in application scenarios?
- Through technical systems!



- Those need to be trusted as well
- Chains of trust become increasingly long and complex

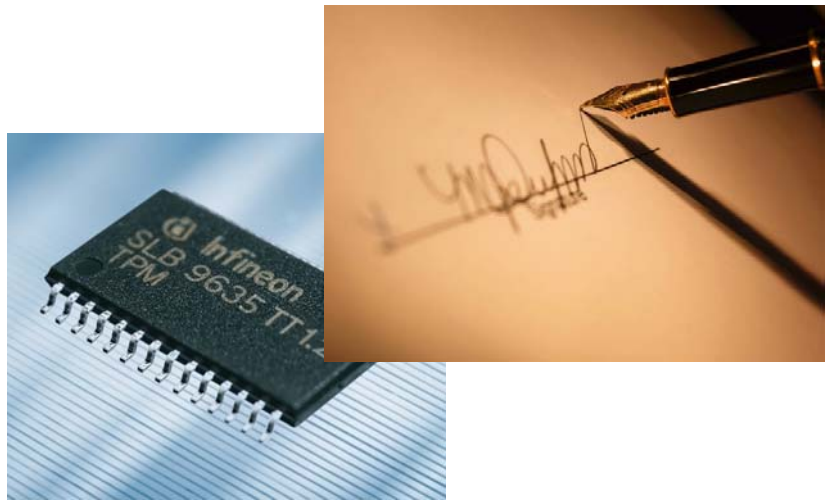


Transitive trust:
Attest a systems trustworthiness to a third party over multiple hops

Attestation:
Provide authentic information about a system‘s state to a verifier

Attestation and Trust

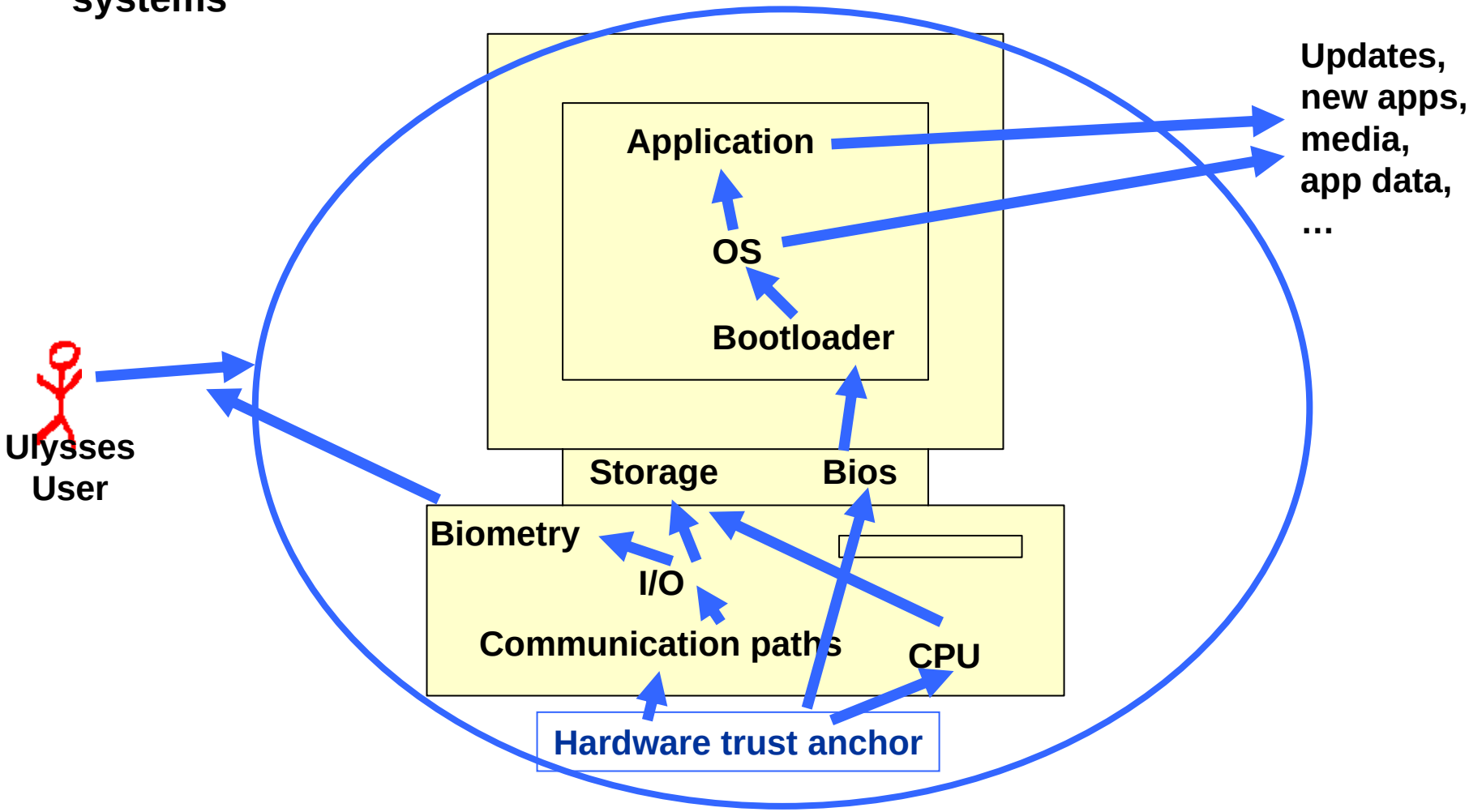
- American Heritage Dictionary says:
  - Attestation: “To affirm to be true, correct or genuine”
- For trusted platforms:
  - Cryptographic proof of information regarding the platform
- Information that could be attested to includes:
  - HW on platform
  - BIOS
  - Configuration options
  - And much more
- Trusted Computing provides a hardware trust anchor
- and surrounding technology and infrastructure standards



- Trust
  - An entity can be trusted if it always behaves in the expected manner for the intended purpose
- Trusted Computing
  - Basically a reporting technology to testify the state of a certain system to and optionally its identity to an external verifier

Trusting an open system

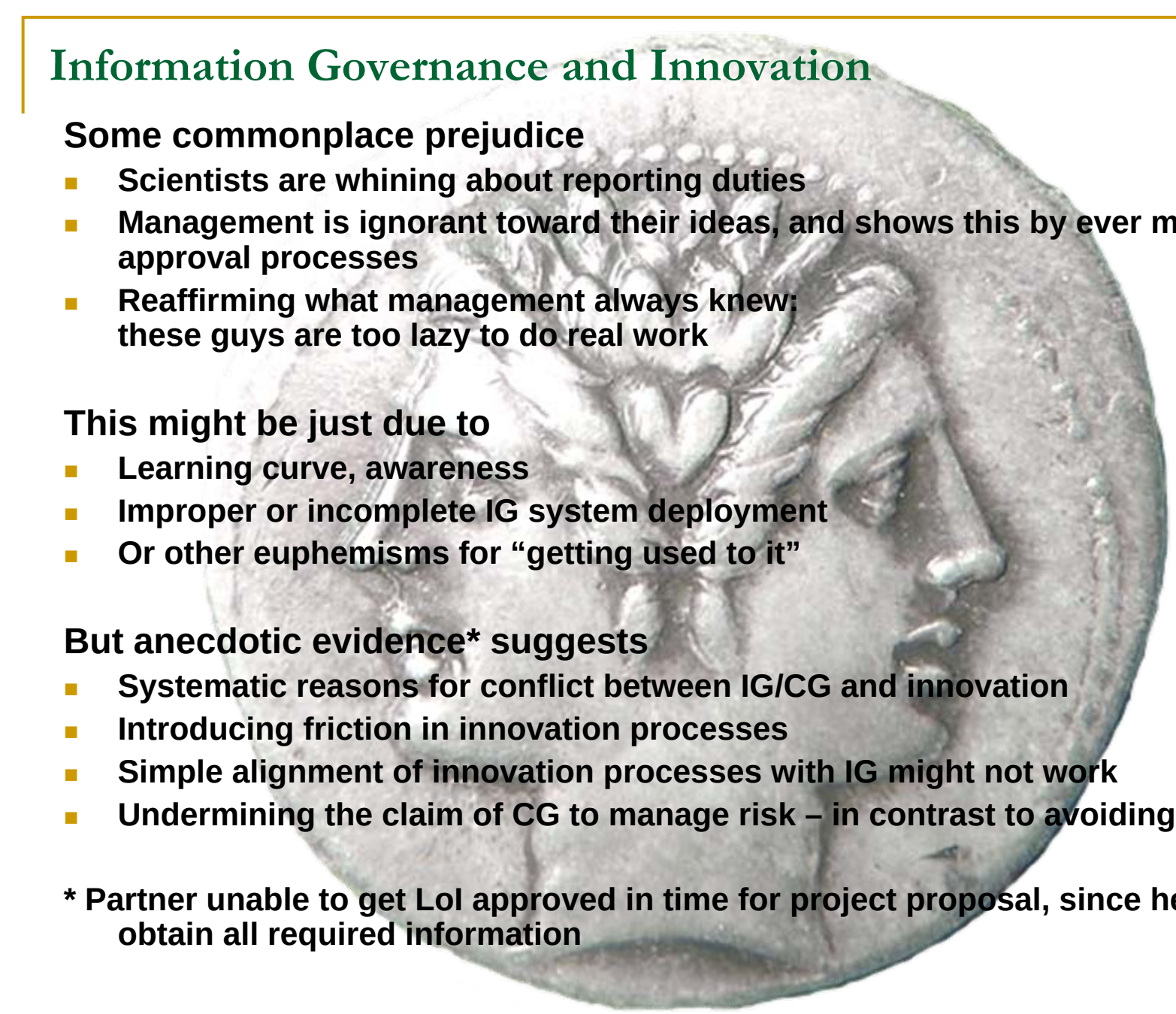
- **Many components are involved in trust chains in complex, open systems**



TC – IG related Use Cases

- Securing data storage and archives to comply with data protection
- Attesting to systems' states while handling information in workflows, e.g
- Attested transformations, scanners, printers
- Secure communication
- Securing signature terminals
- …

Information Governance and Innovation



Some commonplace prejudice

- Scientists are whining about reporting duties
- Management is ignorant toward their ideas, and shows this by ever more detailed approval processes
- Reaffirming what management always knew: these guys are too lazy to do real work

This might be just due to

- Learning curve, awareness
- Improper or incomplete IG system deployment
- Or other euphemisms for "getting used to it"

But anecdotic evidence* suggests

- Systematic reasons for conflict between IG/CG and innovation
- Introducing friction in innovation processes
- Simple alignment of innovation processes with IG might not work
- Undermining the claim of CG to manage risk – in contrast to avoiding it

* Partner unable to get LoI approved in time for project proposal, since he could not obtain all required information

Innovation and Information Economy

- Pfizer's Incubator project
  - Innovation park, funded with $50M over 5 years
  - Investment in start-ups
  - looks like outsourcing, but
  - Projects without a concrete drug in the pipeline
  - Basic research with high risk which fails to attract conventional venture capital
  - Streamlined approval process – no business plans
  - Incubator is run independently from mother company

- What Incubator does, phrased differently in terms of
  - Industrial Organisation: Vertical disintegration externalises innovation process and associated risk
  - IG: Reduces internal requirements
  - Information Security: implements a minimal need to know principle by separation of duties
  - Information Economy:
    - Removes information asymmetry, by simplifying contractual situation
    - Mitigates moral hazard

- Information Economy should provide more insight into the impact of IG

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Specific sources for images and texts in this presentation are

- Bristol Primary Care Trust, Education Training Department: EDUCATION & TRAINING BULLETIN. JANUARY – JUNE 2008
- www.pfizer.com/
- gwydir.demon.co.uk/diaries/
- http://www.nicholsoncartoons.com.au/
- State of Texas, Department of Information Resources. Guidelines for the Management of Electronic Transactions and Signed Records
- Infineon

Backup slides

The TCG

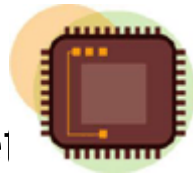
- Formed 2003, now ~200 organisations, among them Fraunhofer SIT as academic liaison member
- Not-for-profit organization,
  - formed to develop, define and promote open, vendor-independent specifications for trusted computing and security technologies, including hardware building blocks and software interfaces, across multiple platforms, peripherals and devices
  - Efforts to ensure compliance and conformance of TPMs and trusted hardware
- www.trustedcomputinggroup.org
- And by the way: DRM is not on the agenda!

Working Groups

- Mobile
  - provides trust for mobile devices including mobile phones and PDAs
- PC Client
  - provides common functionality, interfaces and a set of security and privacy requirements for PC clients that use TCG components to establish their root of trust

- Trusted Platform Module
  - created the Trusted Platform Module (TPM) specificat version 1.1b and 1.2. The TPM is the root of trust that is the basis of the work of the other TCG work groups.

- Infrastructure
  - defines architectural framework, interfaces and me necessary to bridge infrastructure gaps



Working Groups

- Hard Copy
  - defining open, vendor-neutral specifications for hardcopy devices that will use TCG components to establish their root of trust.
- Software Stack
  - provides a standard set of APIs for application vendors who wish to make use of the TPM.
- Server
  - provides definitions, specifications, guidelines and technical requirements as they pertain to the implementation of TCG technology in servers.
- Storage
  - is building upon existing TCG technologies and focusing on standards for security services on dedicated storage systems.
- Trusted Network Connect
  - focuses on ensuring endpoint compliance with integrity policies at and after network connection.