

# Security & Compliance in Big Data, Clouds, and Cyberphysical Systems

Prof. Dr. Jan Jürjens

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## Scientific Coordinator

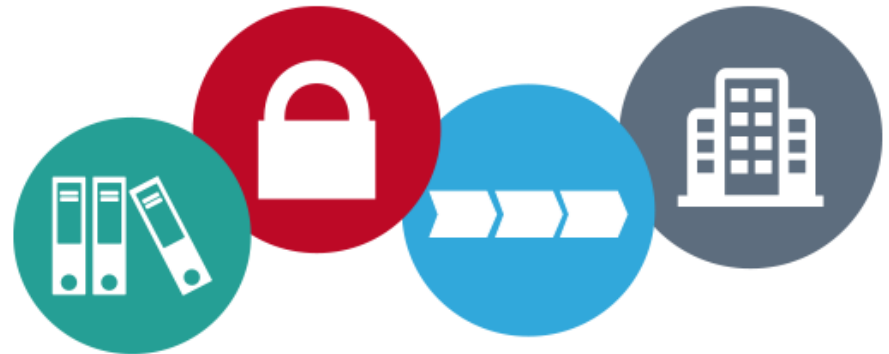
Fraunhofer Institute for Software- and Systemtechnology ISST  
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## Head of Compliance Innovation Lab

Fraunhofer Innovation Center Logistics & IT FILIT (Dortmund)  
<http://www.filit.fraunhofer.de/de/compliance-innovation-lab.html>

## Professor for Software Engineering

Technical University of Dortmund  
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# Fraunhofer Institute for Software- and Systemtechnology ISST, Dortmund (Germany)

## Compliance and IT Security Solutions

Solutions for IT security and compliance.

## E-Healthcare

Secure IT-infrastructures for the healthcare system, standardized solutions for data exchange (electronic case records), hospital engineering, telemedicine.

## Logistics-IT

Optimization of IT-resources and logistics IT-services employing Cloud Computing.

**Fraunhofer Innovation Center Logistics & IT FILIT**  
(joint center together with Fraunhofer IML (Logistics)).

## Cooperation Partner: Technical University of Dortmund

Foundational research partner of Fraunhofer ISST. Beneficial cooperation also in EU projects (excellence in foundational research & tech transfer; as third-parties to save money).



# Relevant Background and Experience – Who am I ?

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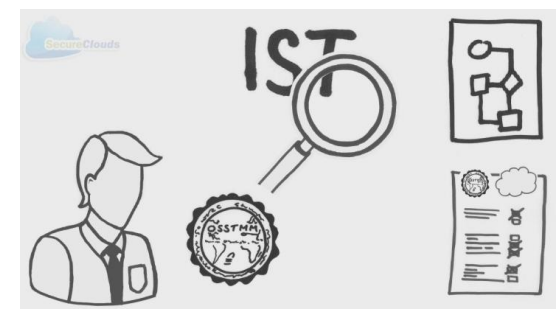
- Scientific Coordinator (Fraunhofer ISST)
- Head, Compliance Innovation Lab (Fraunhofer FILIT)
- Professor for Software Engineering (TU Dortmund)
- Senior Member (Robinson College)
- Inventor of **UMLsec** approach for secure software development
- „10 years most influential paper“ award; ca. 4000 citations (h-index 31)
- Long-standing experience in **leading and reviewing EU research projects**

Previously:

- Royal Society Industrial Fellow (Microsoft Research Cambridge)
- Non-stipendiary Research Fellow (Robinson College, Univ. Cambridge)
- PhD in Computing (Univ. Oxford), extended stay at Univ. Edinburgh
- Senior Lecturer, Open University (UK)
- Extended research stay at **Bells Labs (Silicon Valley)**
- Postdoc (TU München, Prof. Manfred Broy)

# Some Current / Recent Projects

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**Secure Change (EU IP):** Recertification of security after **system change**  
(Scientific Director)

**SECONOMICS (EU STREP):** Tools for **economic analysis of security**  
investments (e.g. in **cyber-physical systems**)

**Apex (FhG):** Architectures for **Auditable Business Process Execution:**  
**Monitoring, Control, and Compliance (Fraunhofer Attract;**  
**Scientific Excellence Program of Fraunhofer)**

**ClouDAT (IKT.NRW):** **Security certification of cloud infrastructures.**

**SecVolution (DFG):** **Recertification of security of change of system**  
**environment**

**SecureClouds (BMBF):** **Compliance analysis during process migration into**  
**clouds**

**Project leadership & acquisition of > 5 mio EUR over last 5 years**

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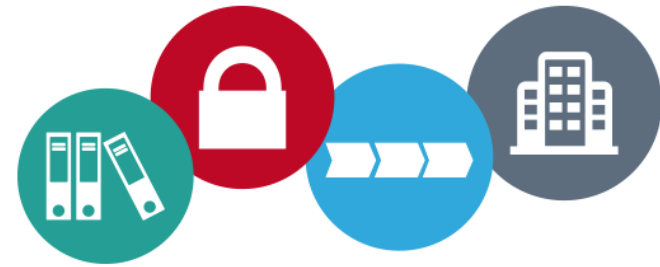
# Some Applications

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- Electronic Health Card
- Security policies for mobile devices
- Secure digital document handling
- Electronic Purse (CEPS)
- Return-on-Security Investment analysis
- Security analysis for electronic signatures in the insurance domain
- IT security risk analysis at chip manufacturer
- Software update platform for smartcards
- Security certification of cloud infrastructures
- Compliance analysis during process migration into clouds



# EU Project Proposals in Preparation - Partners wanted !



**Security & Compliance:** Certifying security & compliance in long-living systems

**Big Data:** Privacy-Ensuring Data-Mining in Personal Customer Data

**Clouds:** Client-Side Monitoring of Security Guarantees by Cloud Providers

**Digital Factories:** Security Hardening of Critical Infrastructures using Model-based Design

**Logistics-IT:** Platform for Secure Peer-to-Peer Resource-Sharing

**E-Healthcare:**

Privacy-Ensuring Business Process Mining in the Medical Domain

Infrastructure for Compliance-Monitoring in the Hospital

Infrastructure for Quality Assurance in the Medical Domain

**Further ideas always welcome – please get in touch !**

➔ <http://jan.jurjens.de>

# Backup

# Fraunhofer Institute for Software- and Systemtechnology ISST, Dortmund (Germany)

Being member of the Fraunhofer ICT Group, the Fraunhofer Institute for Software and Systems Engineering ISST is one of the key players in the German IT-research.

Founded in 1992, the institute develops

- standards, architectures and concepts for **distributed and networked applications** as well as
- solutions for demand-based information supply at the right time and place: **information logistics**.



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# Compliance and IT Security Solutions



## Objective:

- Development of a software engineering methodology, which enables quality assurance throughout the different phases of the life-cycle of software systems, especially with regard to non-functional requirements.
- Main focus lies on IT-security and compliance requirements (quality management by analyzing artifacts, which are being created anyway within the context of the latest methods of software development and application)
- Examples: specifications on the basis of Unified Modeling Language (UML) in the area of software development, business process models in the area of applications

# Background on European RTD projects: EU-Project »Socio-Economics meets Security«

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## Objective:

- Support of decision makers
  - Development of approaches and software-tools for (risk-) analyses of socio-economic aspects regarding information security, especially within the context of cyber-physical systems.
  - Application scenarios: international air transportation (airport Anadolu), public transport (Barcelona) und energy grids (National Grid, UK).
  - Fraunhofer ISST and the TU Dortmund analyze IT-security risks on the basis of models.
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- **Project partners:** University Trento, University Aberdeen, University Rey Juan Carlos, Acad. Sci. Czech Republic, ATOS Origin, National Grid (UK), TAV, Ferrocarril, SecureNOK, Deep Blue.
  - **Project duration:** February 2012 to January 2015
  - **Funding:** European Union (STREP within the 7. Framework Programme for Research and Technological Development) (FP7-SEC-2011-1)

# Reference Project »SecureClouds«

## Transferring Processes Securely into the Cloud

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### Objective:

- Development of an analytic tool environment for the security-demand analysis of processes which are meant to be transferred to a cloud environment.
- Based on artifacts existing in the company (e.g. documents, forms, log files), business processes to be transferred into the cloud, are being tested with the help of tools and outsourced according to security and compliance requirements.



[www.secureclouds.de](http://www.secureclouds.de)

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- **Project partners:** admeritia GmbH, LinogistiX GmbH, TU Dortmund
  - **Project duration:** May 2011 to April 2013
  - **Funding:** Federal Ministry of Education and Research (BMBF) in the context of KMU-innovativ, reference 01|S11008D