A Legal and Technical Perspective on Secure Cloud Storage

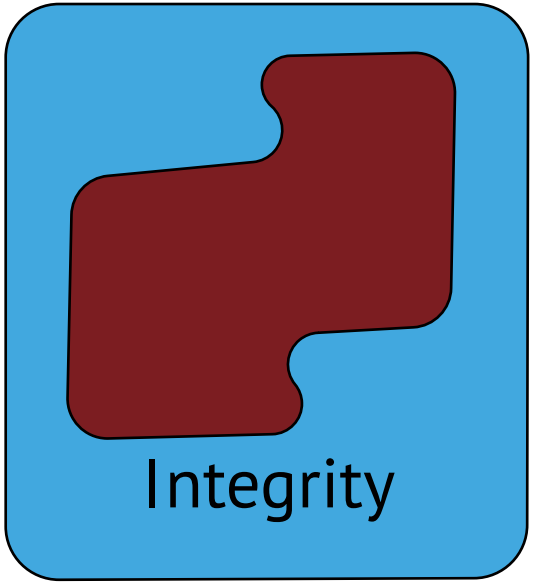
Sebastian Graf, Jörg Eisele and Marcel Waldvogel
University of Konstanz

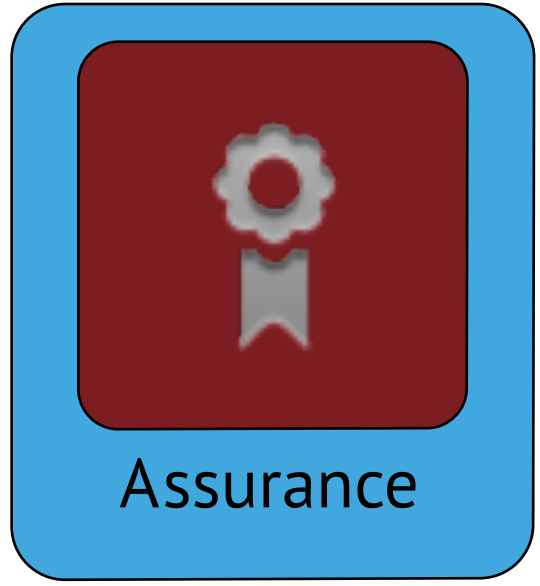
Marc Strittmatter
HTWG Konstanz

Cloud Services from a customers point of view

Cloud services from a technical point of view

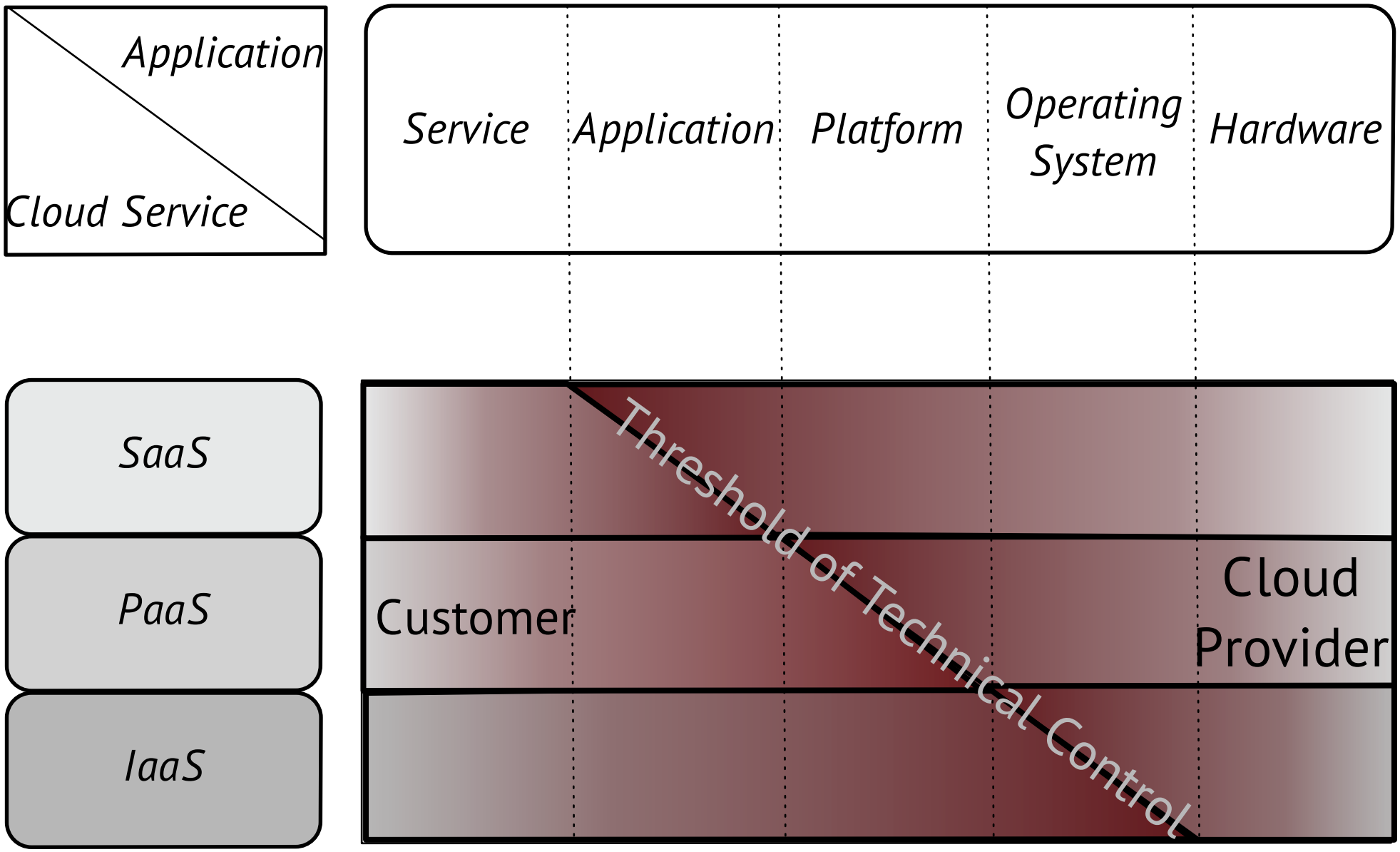
Security Goals to achieve

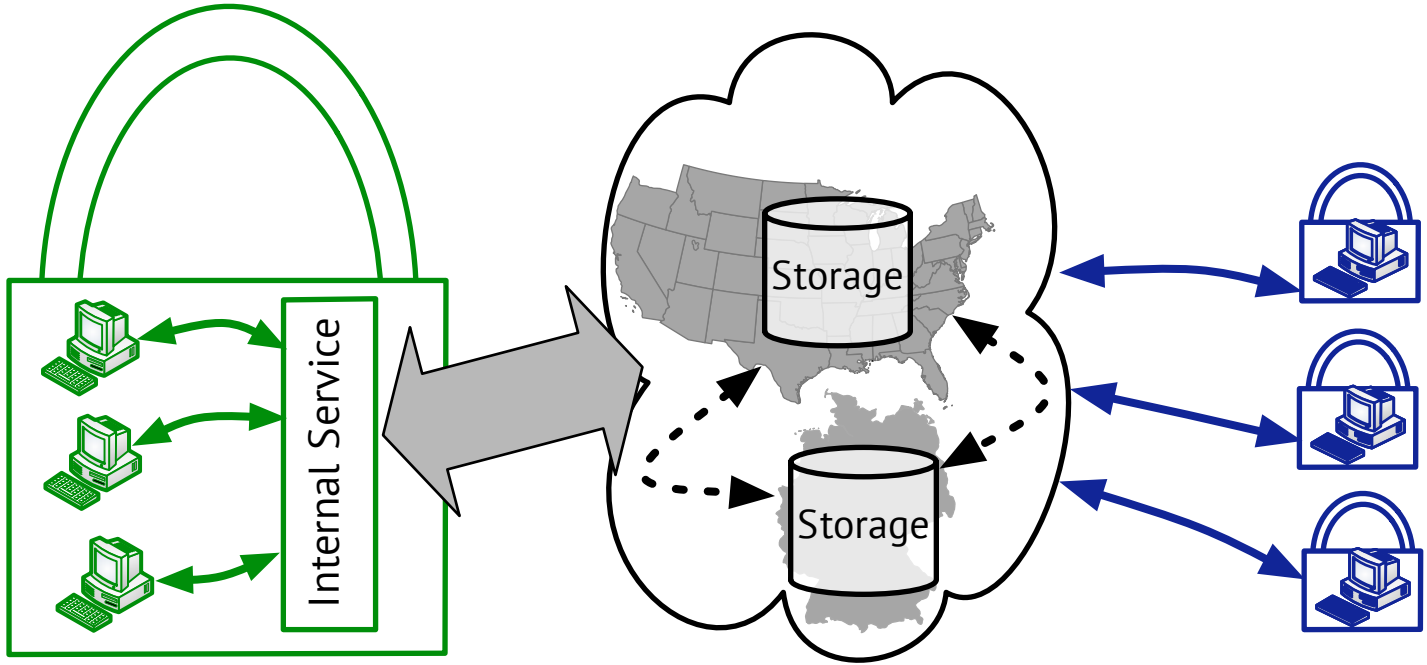




Responsibility
in the cloud?

Point of technical interference

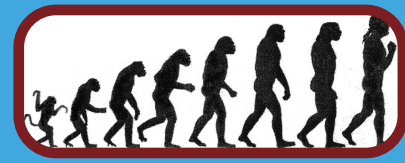




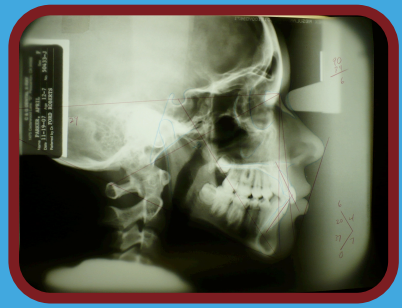
User-Centric VS Application-Centric Usage

Techniques to establish security

Confidentiality



Accountability



Integrity

Availability

?

Assurance

How to guarantee
security behind the wall?

Legal Aspects

Unauthorized Access

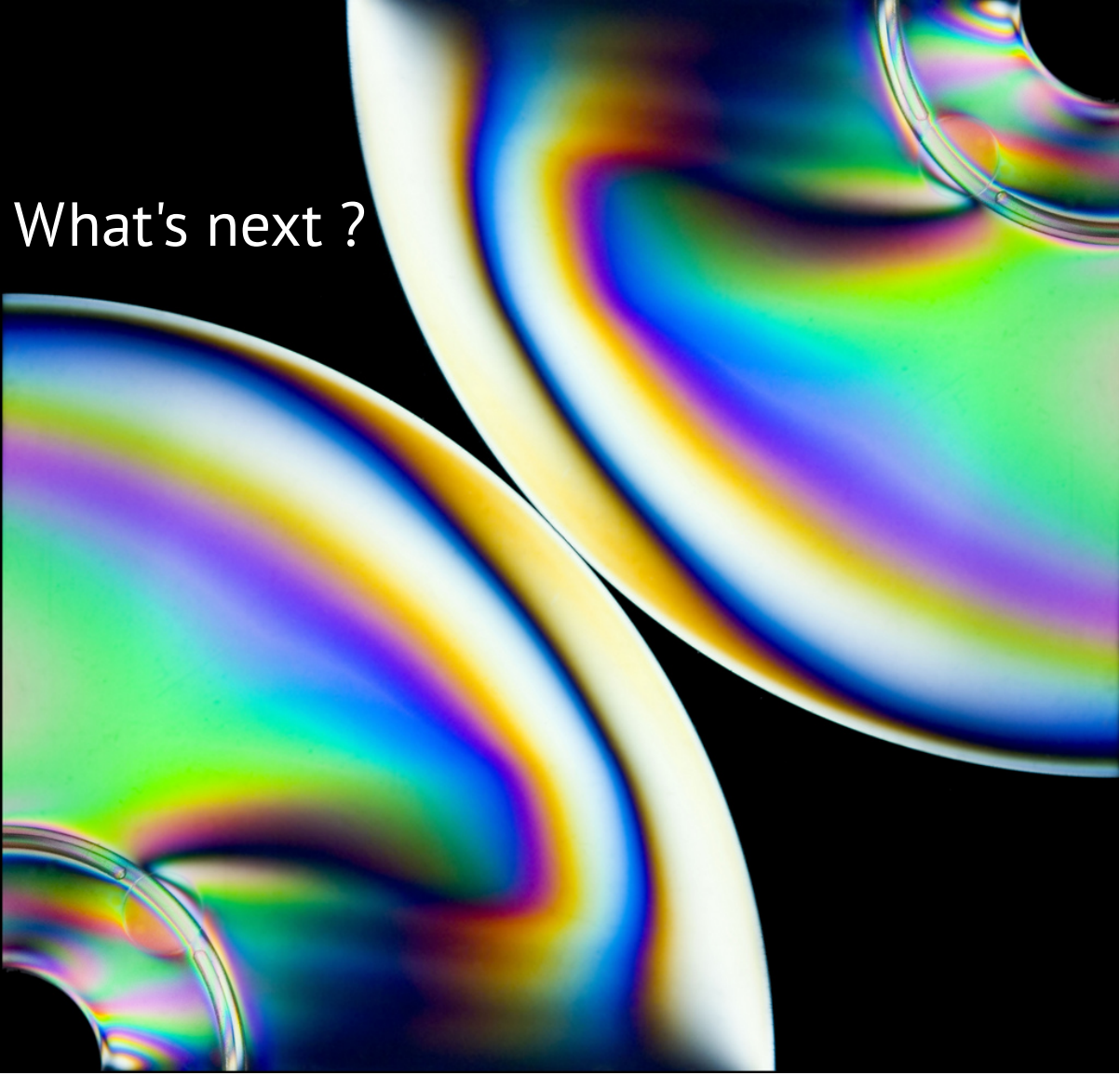
Harming Data

Privacy

Author's Rights

Contracts

Integrity
Availability
Legal Aspects
§303a StGB
§43,2 BDST
§202a StGB
§202b StGB
§106 UrhG
§108 UrhG
Accountability
Confidentiality
Integrity
Availability
Technical Measures
Erasure Codes
Caching
Checksumming
Signatures
Encryption
Key Mgmt
Policies
Versioning
Accountability
Confidentiality


What's next ?

Thanks for your attention!

Questions?

Sebastian Graf
Distributed Systems Group
University of Konstanz
sebastian.graf@uni-konstanz.de

CC BY NC SA

References to Pictures

- Slide 2:
  - Picture from http://www.sxc.hu/photo/447540 under sxu license from Kroma Kromalski, Poland (http://www.sxc.hu/profile/krominator)
- Slide 3:
  - Picture under morgueFile Free License from http://morguefile.com/archive/display/68626
- Slide 5:
  - Picture from http://www.flickr.com/photos/65193799@N00/13647107/ under Creative Commons from DB Kind, USA (http://www.flickr.com/people/bootbearwdc/)
- Slide 8:
  - Picture from http://www.imageafter.com/image.php?image=b4objects010.jpg
  - Picture under Public Domain from https://commons.wikimedia.org
  - Picture from http://www.flickr.com/photos/daveparker/2104384103/ under Creative Commons from Dave Paker, USA (http://www.flickr.com/photos/daveparker/)
  - Picture from http://www.sxc.hu/photo/578263 under sxu license
- Slide 9:
  - Picture from http://www.sxc.hu/photo/423488 under sxu license
- Slide 10:
  - Picture under morgueFile Free License from http://www.morguefile.com/archive/display/695726
  - Picture under Public Domain from https://commons.wikimedia.org
  - Picture from http://www.flickr.com/photos/aroberts/3035796/ under Creative Commons from Andy Roberts, UK (http://www.flickr.com/people/aroberts/)
  - Picture under morgueFile Free License from http://www.morguefile.com/archive/display/99284
  - Picture under morgueFile Free License from http://www.morguefile.com/archive/display/52246
- Slide 11:
  - Picture from http://www.dreamstime.com/royalty-free-stock-image-two-faced-head-fire-ice-statue-image22772076
- Slide 12:
  - Picture from http://www.flickr.com/photos/30564501@N02/2862358989/ under Creative Commons from Jurgen Dabeedin, UK (http://www.flickr.com/people/30564501@N0

References to Literature

[BCQ+11] Alysson Bessani, Miguel Correia, Bruno Quaresma, Fernando André, and Paulo Sousa. DepSky: dependable and secure storage in a cloud-of-clouds. In *Proceedings of the sixth conference on Computer systems*, EuroSys '11, 2011.

[BJO09] Kevin D. Bowers, Ari Juels, and Alina Oprea. HAIL: a high-availability and integrity layer for cloud storage. In *Proceedings of the 16th ACM conference on Computer and communications security*, CCS '09, 2009.

[Fie00] Roy Thomas Fielding. *Architectural styles and the design of network-based software architectures*. PhD thesis, University of California, Irvine, 2000. Chair-Taylor, Richard N.

[Gar07] Simson L. Garfinkel. An Evaluation of Amazons Grid Computing Services: EC2, S3, and SQS. Technical report, Center for, 2007.

[GKW11] Sebastian Graf, Marc Kramis, and Marcel Waldvogel. Treetank: Designing a Versioned XML Storage. In *XMLPrague'11*, 2011.

[GMSW06] Dominik Grolimund, Luzius Meisser, Stefan Schmid, and Roger Wattenhofer. Cryptree: A Folder Tree Structure for Cryptographic File Systems. In *25th IEEE Symposium on Reliable Distributed Systems (SRDS), Leeds, United Kingdom*, October 2006.

[Gra11] Sebastian Graf. A secure cloud gateway based upon XML and web services. In *PhD Symposium, ECOWS'11*, 2011.

[Lam01] Pradip Lamsal. Understanding Trust and Security, 2001.

[MG09] Peter Mell and Tim Grance. The NIST definition of cloud computing. *National Institute of Standards and Technology*, 53(6), 2009.

[Sch00] Bruce Schneier. *Secrets and lies: digital security in a networked world*. John Wiley, 2000.

[Sto01] Gary Stoneburner. Underlaying Technical Models for Information Technology Security. *National Institute of Standards and Technology*, 2001.