



Rolf H. Weber
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Internet of Things

Legal Perspectives



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Preface

The Internet of Things as an emerging global Internet-based information architecture facilitating the exchange of goods and services is gradually developing. While the technology of the Internet of Things is still being discussed and created, the legal framework should be established before the Internet of Things is fully operable, in order to allow for an effective introduction of the new information architecture. If a self-regulatory approach is to be adopted to provide a legal framework for the Internet of Things, and this seems preferable, rulemakers can draw on experiences from the current regime of Internet governance. In the near future, mainly businesses will operate in the Internet of Things. Civil society is only expected to make use of the Internet of Things, as it now does of the Internet, at a later stage (e.g. for healthcare).

The Internet of Things will have an impact in various areas. The regulatory framework must provide for provisions ensuring the security of the structure as well as the privacy of its users. Furthermore, legal barriers that may stand in the way of the coming into operation of the Internet of Things will have to be considered. However, the Internet of Things will also have positive effects in different fields, such as the inclusion of developing countries in global trade, the use of search engines to the benefit of civil society, combating product counterfeiting, tackling environmental concerns, improving health conditions, securing food supply and monitoring compliance with labor standards.

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Any comments and suggestions from readers would be highly appreciated (rolf.weber@rwi.uzh.ch).

Zurich, November 2009

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- AHLE ULRICH, RFID im praktischen Einsatz, in: Hans-Jörg Bullinger (ed.), *Internet der Dinge*, Berlin 2007, 331–345.
- ANDERSON KENNETH, Book Review: Squaring the Circle? Reconciling Sovereignty and Global Governance through Global Government Networks, *Harvard Law Review*, Vol. 118, 2005, 1255–1312.
- ARIOLI MARTINA/THALMANN ANDRÉ, Einsatz von RFID im Rechtsverkehr, *AJP* 5/2006, 549–560.
- BALAKRISHNAN HARI/KAASHOEK FRANS/DARGER DAVID/MORRIS ROBERT/STOICA ION, Looking Up Data in P2P Systems, *Communications of the ACM*, Vol. 46, 2003, 43–48.
- BASHO KALINDA, The Licensing of Our Personal Information: Is It a Solution to Internet Privacy?, *California Law Review*, Vol. 88, 2000, 1507–1545.
- BENDRATH RALF/JØRGENSEN RIKKE FRANK, The World Summit on the Information Society – Privacy not Found?, *Script-ed*, Vol. 3, 2006, 355–369.
- BENEDEK WOLFGANG, Internet Governance and Human Rights, in: Wolfgang Benedek/Veronika Bauer/Matthias C. Kettmann (eds), *Internet Governance and the Information Society*, Utrecht 2008, 31–49.
- BENGHOZI PIERRE-JEAN/BUREAU SYLVAIN/MASSIT-FOLLÉA FRANÇOISE, *L’Internet des Objets: Quels Enjeux pour l’Europe? – The Internet of Things: What Challenges for Europe?*, Paris 2009.
- BENHAMOU BERNARD, *Organizing Internet Architecture*, available at: http://www.diplomatie.gouv.fr/en/IMG/pdf/Organizing_Internet_Architecture.pdf (BENHAMOU, *Internet Architecture*).
- BENHAMOU BERNARD, *A European Governance Perspective on the Object Naming Service, Governance of Resources*, available at: ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/ch1-lisbon-20071215_en.pdf (BENHAMOU, *Governance Perspective*).
- BENZ ARTHUR, Einleitung: Governance – Modebegriff oder nützliches sozialwissenschaftliches Konzept?, in: Arthur Benz (ed.), *Governance – Regieren in komplexen Regelsystemen*, Wiesbaden 2004, 11–28.
- BIENKOWSKI PAWEŁ, Electromagnetic Fields Measurements – Methods and Accuracy Estimation, in: Andrzej Krawczyk/Roman Kubacki/Sławomir Wiak/Carlos Lemos Antunes (eds), *Electromagnetic Fields, Health and Environment*, Amsterdam 2008, 229–237.
- BIRKINSHAW PATRICK, Freedom of Information and Openness: Fundamental Human Rights?, *Administrative Law Review*, Vol. 58, 2006, 177–218.
- BIRNIE PATRICIA W./BOYLE ALAN E./REDGWELL CATHERINE, *International Law & the Environment*, 3rd edition Oxford 2009.
- BIROLINI ALESSANDRO, *Reliability Engineering*, 5th edition Berlin 2007.
- BLACK JULIA, Constitutionalizing Self-Regulation, *Modern Law Review*, Vol. 59, 1996, 24–55.

- BORKING JOHN J., Privacy Standards for Trust, *Weblaw-Jusletter*, 3 October 2005.
- BOTELHO M. FILOMENA/SANTOS A. CRISTINA/LOPES M. CARMO ET AL., Effects of Radiation in Cellular Cultures, in: Andrzej Krawczyk/Roman Kubacki/Sławomir Wiak/Carlos Lemos Antunes (eds), *Electromagnetic Field, Health and Environment*, Amsterdam 2008, 67–71.
- BOWN CHAD P., On the Economic Success of GATT/WTO Dispute Settlement, *The Review of Economics and Statistics*, Vol. 86, 2004, 811–823.
- BREWER ERIC A., When Everything is Searchable, *Communications of the ACM*, Vol. 44, 2001, 53–55.
- BROWNLIE IAN, *Principles of Public International Law*, 7th edition Oxford/New York 2008.
- BURKERT HERBERT, Globalization – Strategies for Data Protection, *Weblaw-Jusletter*, 3 October 2005.
- BYGRAVE LEE A./SCHIAVETTA SUSAN/THUNEM HILDE/LANGE ANNEBETH B./PHILLIPS EDWARD, The Naming Game: Governance of the Domain Name System, in: Lee A. Bygrave/Jon Bing (eds), *Internet Governance – Infrastructure and Institutions*, Oxford 2009, 147–212.
- CAMPBELL ANGELA, Self-Regulation and the Media, *Federal Communications Law Journal*, Vol. 51, 1999, 711–772.
- CHEON KANGSIK, Multilingualism and the Domain Name System, available at: http://www.wgig.org/docs/book/Kangsik_Cheon%20.pdf.
- CHEUNG ANNE/ROLF H. WEBER, Internet Governance and the Responsibility of Internet Service Providers, *Wisconsin International Law Journal*, Vol. 26, 2008, 403–477.
- DALAL REEPAL S., Chipping away the Constitution: The increasing use of RFID chips could lead to an erosion of privacy rights, *Boston University Law Review*, Vol. 86, 2005, 485–514.
- DE VEY MESTDAGH KEES/RIJGERSBERG RUDOLF W., Rethinking Accountability in Cyberspace: A New Perspective on ICANN, *International Review of Law, Computers & Technology*, Vol. 21, 2007, 27–38.
- DORIA AVRI/KLEINWÄCHTER WOLFGANG (eds), *Internet Governance Forum (IGF): The First Two Years*, a UNESCO Publication for the World Summit of the Information Society – Special issue co-produced with ITU and UNDESA, December 2008, available at: <http://www.intgovforum.org/cms/index.php/component/content/article/57-2008igf/311-internet-governance-forum-the-first-two-years>.
- DOWNIE DAVID L./LEVY MARC A., The UN Environment Programme at a turning point: Options for change, in: Pamela S. Chasek (ed.), *The Global Environment in the Twenty-first Century: Prospects for International Cooperation*, Tokyo 2000, 355–377.
- DRUEY JEAN NICOLAS, *Information als Gegenstand des Rechts*, Zurich 1995.
- DWIVEDI O.P./JABBARA JOSEPH G., Introduction: Public Service Responsibility and Accountability, in: O.P. Dwivedi/Joseph G. Jabbara (eds), *Public Service Accountability*, West Hartford, Connecticut 1989, 1–16.

- EBRAHIM ALNOOR/HERZ STEVE, *Accountability in Complex Organizations: World Bank Responses to Civil Society*, John F. Kennedy School of Government, Harvard University, December 2007, RWP 07–060, available at: <http://www.hbs.edu/research/pdf/08–027.pdf>.
- EHRENBERG DANIEL S., *The Labor Link: Applying the International Trading System to Enforce Violations of Forced and Child Labor*, *Yale Journal of International Law*, Vol. 20, 1995, 361–417.
- ESCHET GAL, *Protecting Privacy in the web of Radio Frequency Identification*, *Jurimetrics*, Vol. 45, 2005, 301–332.
- EVDOKIMOV SERGEI/FABIAN BENJAMIN/GÜNTHER OLIVER, *Multipolarity for the Object Naming Service*, in: Christian Floerkemeier/Marc Langheinrich/Elgar Fleisch/Friedemann Mattern/Sanjay E. Sarma (eds), *The Internet of Things*, Berlin/Heidelberg 2008, 1–18.
- FABIAN BENJAMIN, *Secure Name Services for the Internet of Things*, Thesis, Berlin 2008.
- FABIAN BENJAMIN/GÜNTHER OLIVER, *Security Challenges of the EPCglobal Network*, *Communications of the ACM*, Vol. 52, July 2009, 121–125 (FABIAN/GÜNTHER, *Security Challenges*).
- FABIAN BENJAMIN/GÜNTHER OLIVER, *Distributed ONS and its Impact on Privacy*, available at: <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=04288878> (FABIAN/GÜNTHER, *Distributed ONS*).
- FABIAN BENJAMIN/GÜNTHER OLIVER/SPIEKERMANN SARAH, *Security Analysis of the Object Name Service*, available at: <http://lasecwww.epfl.ch/~gavoine/download/papers/FabianGS-2005-sptpuc.pdf>.
- FITZGERALD BRIAN/O'BRIEN DAMIEN/FITZGERALD ANNE, *Search Engine Liability for Copyright Infringements*, available at: <http://eprints.qut.edu.au/7883/1/7883.pdf>.
- FLOERKEMEIER CHRISTIAN/LANGHEINRICH MARC/FLEISCH ELGAR/MATTERN FRIEDEMANN/SARMA SANJAY E. (eds), *The Internet of Things*, Berlin/Heidelberg 2008.
- FROOMKIN A. MICHAEL, *The Death of Privacy?*, *Stanford Law Review*, Vol. 52, 2000, 1461–1543.
- GIBBONS LLEWELLYN JOSEPH, *No Regulation, Government Regulation, or Self-Regulation: Social Enforcement of Social Contracting for Governance in Cyberspace*, *Cornell Journal of Law and Public Policy*, Vol. 6, 1996–1997, 475–551.
- GOLDMAN ERIC, *Search Engine Bias and the Demise of Search Engine Utopianism*, *Yale Journal of Law and Technology*, Vol. 8, 2005, 188–200.
- GOODHART CHARLES ALBERT ERIC, *Regulating the Regulator – An Economist's Perspective on Accountability and Control* in: Eilis Ferran/Charles Albert Eric Goodhart (eds), *Regulating Financial Services and Markets in the 21st Century*, Oxford 2001, 151–164.
- GRANT RUTH W./KEOHANE ROBERT O., *Accountability and Abuses of Power in World Politics*, *American Political Science Review*, Vol. 99, 2005, 29–43.

- GREWLICH KLAUS W., Governance in “cyberspace”: access and public interest in global communications, The Hague etc. 1999.
- GRIMMELMANN JAMES, The Structure of Search Engine Law, *Iowa Law Review*, Vol. 93, 2008, 1–63.
- GRINGRAS CLIVE, *The Laws of the Internet*, 2nd edition London 2003.
- GRUMMT EBERHARD/MÜLLER MARKUS, Fine-Grained Access Control for EPC Information Services, in: Christian Floerkemeier/Marc Langheinrich/Elgar Fleisch/Friedemann Mattern/Sanjay E. Sarma (eds), *The Internet of Things*, Berlin/Heidelberg 2008, 35–49.
- GUNASEKARA GEHAN, The “Final” Privacy Frontier? Regulating Trans-Border Data Flows, *International Journal of Law and Information Technology*, Vol. 17, 2009, 147–179.
- GÜRSSES SEDA F./BERENDT BETTINA/SANTEN THOMAS, Multilateral Security Requirements Analysis for Preserving Privacy in Ubiquitous Environments, in: Bettina Berendt/Ernestina Menasalvas (eds), *Workshop on Ubiquitous Knowledge Discovery for Users (UKDU '06)*, Berlin 2006, 51–64.
- HALAVAIS ALEXANDER, *Search Engine Society*, Cambridge 2009.
- HALLER STEPHAN/KARNOUSKOS STAMATIS/SCHROTH CHRISTOPH, The Internet of Things in an Enterprise Context, in: John Domingue/Dieter Fensel/Paolo Traverso (eds), *Future Internet – FIS 2008*, Berlin 2009, 14–28.
- HANDLER DARREN, The Wild Wild West: A Privacy Showdown on the Radio Frequency Identification (RFID) Systems Technological Frontier, *Western State University Law Review*, Vol. 32, 2005, 199–225.
- HAWRYLAK PETER J./MICKLE M.H./CAIN J.T., RFID Tags, in: Lu Yan/Yan Zhang/Laurence T. Yang/Huansheng Ning (eds), *The Internet of Things*, New York/London 2008, 1–32.
- HEALD DAVID, Varieties of Transparency, in: Christopher Hood/David Heald (eds), *Transparency. The Key to Better Governance?*, Oxford 2006, 25–43.
- HILDNER LAURA, Defusing the Threat of RFID: Protecting Consumer Privacy through Technology-Specific Legislation at the State, *Harvard Civil Rights – Civil Liberties Law Review*, Vol. 41, 2006, 133–176.
- HOLZNAGEL BERND/SCHUMACHER PASCAL, Auswirkungen des Grundrechts auf Vertraulichkeit und Integrität informationstechnischer Systeme auf RFID-Chips, *Multimedia & Recht*, Vol. 12, 2009, 3–8.
- HOSEIN GUS, Privacy as Freedom, in: Rikke Frank Jørgensen (ed.), *Human Rights in the Global Information Society*, Cambridge/Massachusetts 2006, 121–147.
- JACOBS SCOTT H., Why Governments Must Work Together, *The OECD Observer*, Vol. 186, 1994, 13–16.
- JAKOBSSON MARKUS/RAMZAN ZULFIKAR, *Crimeware: understanding the new attacks and defenses*, Upper Saddle River 2008.
- JOHNSON DAVID R./POST DAVID G., Law and Borders – The Rise of Law in Cyberspace, *Stanford Law Review*, Vol. 48, 1996, 1367–1402.
- JONES ALISON/SUFRIN BRENDA, *EC Competition Law*, 3rd edition Oxford 2008.

- JUELS ARI, RFID Security and Privacy: A Research Survey, *IEEE Journal on Selected Areas in Communications*, Vol. 24, 2006, 381–394.
- KANG JERRY, Information Privacy in Cyberspace Transactions, *Stanford Law Review*, Vol. 50, 1998, 1193–1294.
- KAUFMAN IAN JAY, The Domain System – Act Now or Regret Later, available at: <http://www.ladas.com/Internet/DomainNames/Domain01.html>.
- KENNEDY DAVID, Five basic rules for the Internet of Things, in: EURESCOM mess@ge, 2/2009, at 7, available at: http://www.eurescom.eu/~pub/about-eurescom/message_2009_02/Eurescom_message_02_2009.pdf.
- KEOHANE ROBERT O./NYE JOSEPH S., *Power and Interdependence*, 3rd edition New York 2001.
- KIM KYOUNG HYUN/CHOI EUN YOUNG/LEE SU MI/LEE DONG HOON, Secure EPCglobal Class-1 Gen-2 RFID System Against Security and Privacy Problems, in: Robert Meersman (ed.), *On the Move to Meaningful Internet Systems, OTM 2006 Workshops*, Berlin 2006, 362–371.
- KLEVE PIETER/DEMULDER RICHARD, Privacy protection and the right to information, in: Sylvia Mercado Kierkegaard (ed.), *Cyberlaw, Security and Privacy*, Beijing 2007, 201–212.
- KOH ROBIN/STAAKE THORSTEN, Nutzen von RFID zur Sicherung der Supply Chain der Pharmaindustrie, in: Elgar Fleisch/Friedemann Mattern (eds), *Das Internet der Dinge*, Berlin/Heidelberg 2005, 161–175.
- LANGE STEFAN/SCHIMANK UWE, Governance und gesellschaftliche Integration, in: Stefan Lange/Uwe Schimank (eds), *Governance und gesellschaftliche Integration*, Wiesbaden 2004, 9–44.
- LANGHEINRICH MARC/MATTERN FRIEDEMANN, Wenn der Computer verschwindet, *digma* 2002, 138–142.
- LASTRA ROSA M./SHAMS HEBA, Public Accountability in the Financial Sector, in: Eilis Ferran/Charles Albert Eric Goodhart (eds), *Regulating Financial Services and Markets in the 21st Century*, Oxford 2001, 165–188.
- LEVENE MARK, *An Introduction to Search Engines and Web Navigation*, Harlow 2006.
- LEWICKI FRYDERYK, Progress in the ITU Work Concerning Protection Against Radiation, in: Andrzej Krawczyk/Roman Kubacki/Sławomir Wiak/Carlos Lemos Antunes (eds), *Electromagnetic Field, Health and Environment*, Amsterdam 2008, 244–248.
- MALCOLM JEREMY, *Multi-Stakeholder Governance and the Internet Governance Forum*, Perth 2008.
- MATTERN FRIEDEMANN, Die technische Basis für das Internet der Dinge, in: Elgar Fleisch/Friedemann Mattern (eds), *Das Internet der Dinge*, Berlin/Heidelberg 2005, 39–66 (MATTERN, Technische Basis).
- MATTERN FRIEDEMANN, Ubiquitous Computing: Eine Einführung mit Anmerkungen zu den sozialen und rechtlichen Folgen, in: Jürgen Taeger/Andreas Wiebe (eds), *Mobilität, Telematik, Recht*, Köln 2005, 1–34 (MATTERN, Ubiquitous Computing).