Change the Paradigm: Embed Privacy into Technology and Ride the Next Wave

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Presentation Outline

1. *The Privacy Landscape: Privacy "101"*
2. *Positive-Sum, Not Zero-Sum*
3. *Transformative Technologies*
4. *Biometrics Transformed: Biometric Encryption*
5. *Video Surveillance, Transformed*
6. *Radical Pragmatism*
7. *Conclusions*

The Privacy Landscape: Privacy "101"

Privacy = Freedom

What Privacy is Not

Privacy ≠ Security

Privacy and Security:
The Difference

- Authentication
- Data Integrity
- Confidentiality
- Non-repudiation

Security:

Organizational control of information through information systems

- Privacy; Data Protection
- Fair Information Practices
- “Use” of Personally Identifiable Information (PII)

Information Privacy Defined

Information Privacy: Data Protection

- Freedom of choice; personal control; informational self-determination;
- Control over the collection, use and disclosure of any recorded information about an identifiable individual;
- Privacy principles embodied in "Fair Information Practices."

Fair Information Practices:
A Brief History

- OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data (1980);
- European Union Directive on Data Protection (1995/1998);
- CSA Model Code for the Protection of Personal Information (1996);
- United States Safe Harbor Agreement (2000);
- Global Privacy Standard (2006).
  www.ipc.on.ca/images/Resources/up-gps.pdf

Global Privacy Standard

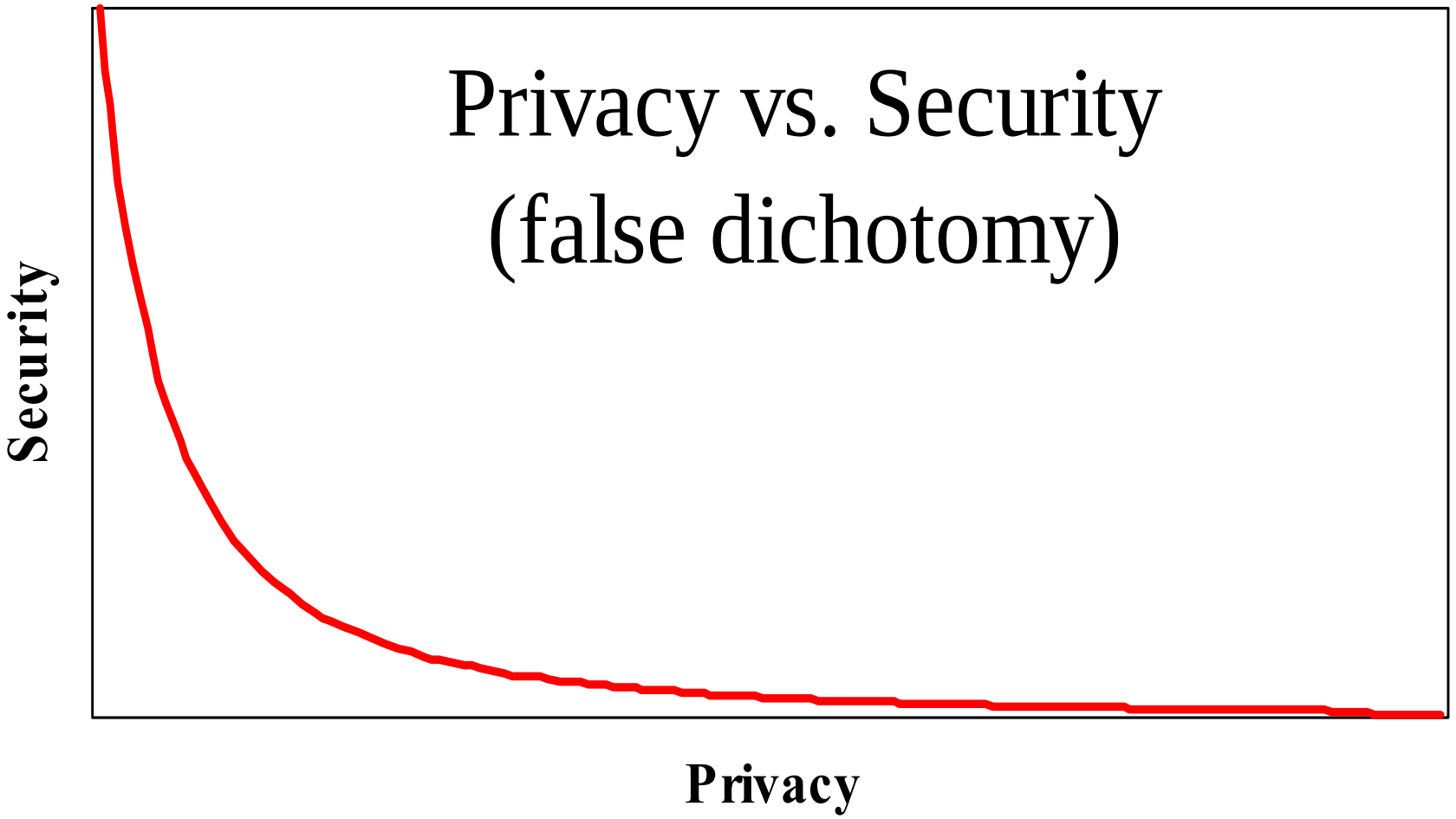
- In 2005, at the 27th International Data Protection Commissioners Conference in Montreux, Switzerland, I chaired a Working Group of Commissioners convened for the sole purpose of creating a single Global Privacy Standard (GPS);
- Globalization and converging business practices created a need to harmonize various sets of fair information practices so that businesses and technology companies could turn to a single instrument for evaluating whether their practices or systems were actually enhancing privacy;
- The GPS builds upon the strengths of existing codes containing time-honoured privacy principles and reflects an enhancement by explicitly recognizing the concept of “data minimization” under the “collection limitation” principle;
- The final version of the GPS was formally tabled and accepted in the United Kingdom, on November 3, 2006, at the 28th International Data Protection Commissioners Conference.

www.ipc.on.ca/images/Resources/up-gps.pdf

If Privacy is to Survive, Things Have to Change

Positive-Sum
NOT
Zero-Sum

Privacy OR Security:
A Zero-Sum Game



We Need to

Change

The Paradigm

Positive-Sum Paradigm

- A **Zero-Sum Paradigm** describes a concept or situation in which one party's gains are balanced by another party's losses – win/lose; either/or; enhancing security often comes at the expense of privacy – the more you have of one, the less you have of the other;
- A **Positive-Sum Paradigm**, in contrast, describes a situation in which *all* participants may gain together (win-win);
- To achieve a positive-sum model, privacy must be proactively built into the system so that privacy protections are engineered directly into the technology, right from the outset;
- The effect is a minimization of the unnecessary collection and use of personal data by the system, while at the same time, strengthening data security, and empowering individuals to exercise greater control;
- This can result in technologies that achieve strong security *and* privacy, delivering a "win-win" outcome.

Positive-Sum Model

Change the paradigm
from a zero-sum to
a positive-sum model:
Create a "win-win" scenario,
not an "either/or"
involving unnecessary
trade-offs

Privacy by Design: "Build It In"

- Build in privacy – up front, into the design specifications; into the architecture; if possible embed privacy right into the technology used – ***bake it in***;
- Assess the risks to privacy: conduct a privacy impact assessment; follow up with annual privacy audits;
- Data minimization is key: minimize the routine collection and use of personally identifiable information – use encrypted or coded information whenever possible;
- Use privacy-enhancing technologies (PETs) where possible: give people maximum control over their own data.

The Next Wave: Transformative Technologies

From PETs to Trans Tech

Transformative Technologies

Surveillance Technology + Positive-Sum Paradigm + Privacy Enhancing Technology =

<u>Transformative Technology</u>

Common characteristics of Transformative Technologies:

- Minimize the unnecessary collection, disclosure, use and retention of personal data;
- Empower individuals to participate in the management of their own personal data;
- Enhance the security of personal data, if collected/used;
- Promote public confidence and trust in personal data governance structures;
- Promote/facilitate the commercialization and adoption of these technologies.

Biometrics Transformed: Biometric Encryption

IPC and Biometrics

- The IPC has been a longstanding proponent of biometric encryption technologies;
- We continue to press for strong privacy protections in the development and deployment of interoperable biometric technologies;
- Active member of the European Biometrics Forum International Biometrics Advisory Council (IBAC).

www.eubiometricforum.com/index.php?option=content&task=view&id=457

European Biometrics Forum

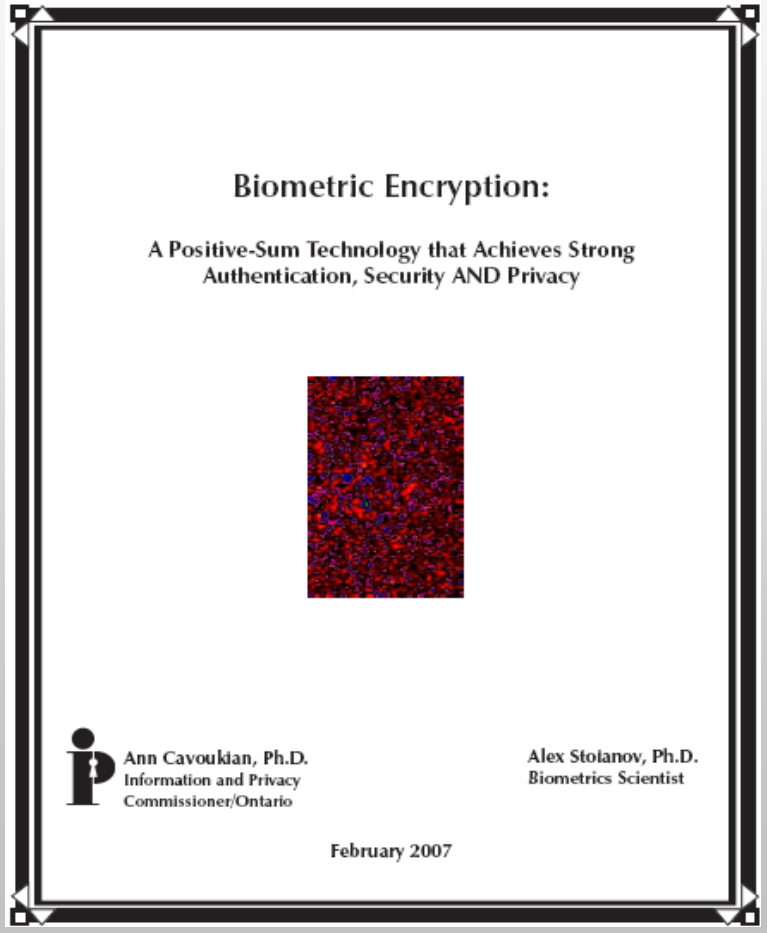
- The European Biometrics Forum (EBF) was launched in 2003; Member of International Biometrics Advisory Council (IBAC);
- Composed of leading biometrics and technology experts, the EBF was established to develop world-class standards, best practices and innovation in the biometrics industry to strengthen trust and confidence in the use of emerging biometric applications;
- The EBF is supported by a network of national biometric organizations, companies, universities and experts across Europe in carrying out research for the development of a roadmap for the European Biometrics industry to 2010.

www.eubiometricforum.com

Biometric Encryption:

A Positive-Sum Technology that Achieves Strong Authentication, Security AND Privacy

- Privacy-enhanced uses of biometrics, with a particular focus on the privacy and security advantages of BE over other uses of biometrics;
- How BE technology can help to overcome the prevailing "zero-sum" mentality by effectively transforming one's biometric to a private key.



www.ipc.on.ca/images/Resources/up-1bio_encryp.pdf

Biometric Encryption (BE)*

What is Biometric Encryption?

- Class of emerging “untraceable biometric” technologies that seek to transform the biometric data provided by the user;
- Special properties:
  - uniqueness
  - irreversibility

* Pioneering development by George Tomko, Ph.D. Founder of Mytec Technologies,1994.

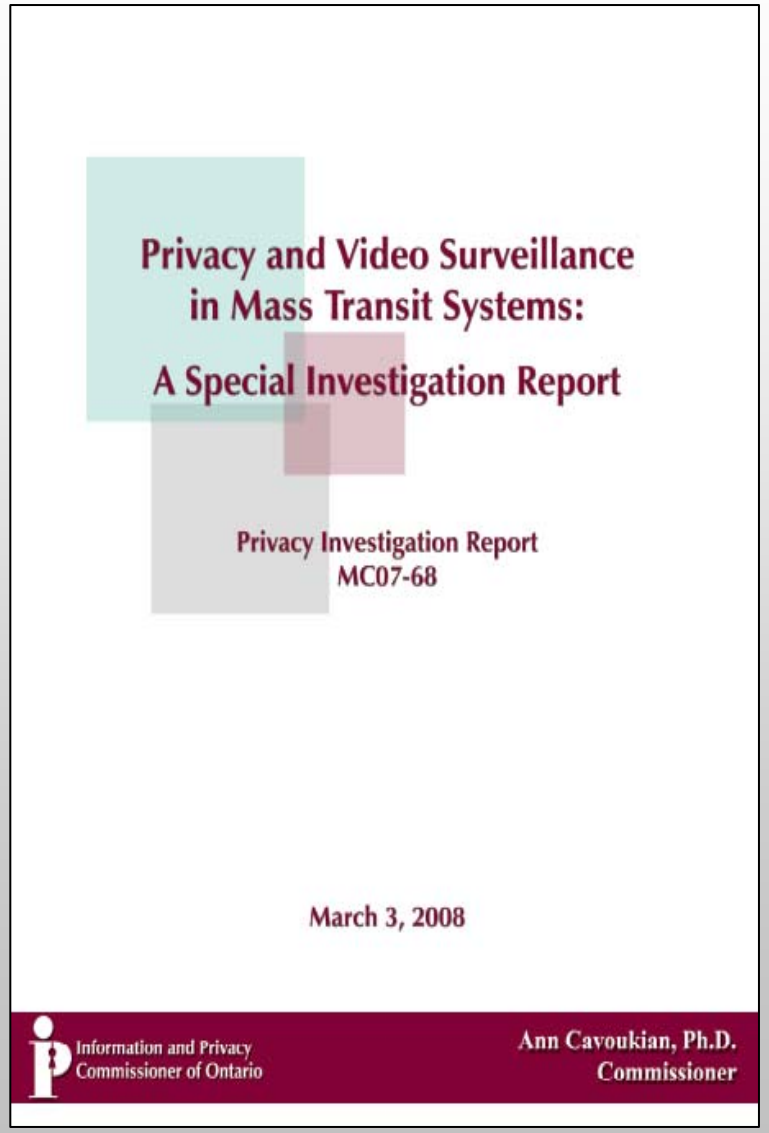
Biometric Encryption

- Biometric encryption is a process that securely binds a PIN or a cryptographic key with a biometric, so that neither the key nor the biometric can be retrieved. The key is recreated only if the correct live biometric sample (a finger or iris) is presented on verification;
- In biometric encryption, you can use the biometric to encrypt a PIN or a password for numerous applications, such as access to computers or bank machines. The PIN can be 100s of digits in length since you don't need to remember it;
- Most important, the only item that has to be stored in a database is the biometrically encrypted PIN or password, not the biometric template, so privacy is preserved.

Video Surveillance, Transformed

TTC Surveillance Cameras

- In March 2008, I ruled that Toronto's Mass Transit System's use of video surveillance cameras was in compliance with Ontario's privacy law.
- However, I called upon the TTC to undertake a number of specific measures to enhance privacy:
  - Personal information will only be collected for legitimate, limited and specific purposes;
  - Collection will be limited to the minimum necessary and **only retained up to 72 hours;**
  - A comprehensive audit of the video surveillance system must be conducted by an independent third party using the GAPP (Generally Accepted Privacy Principles).

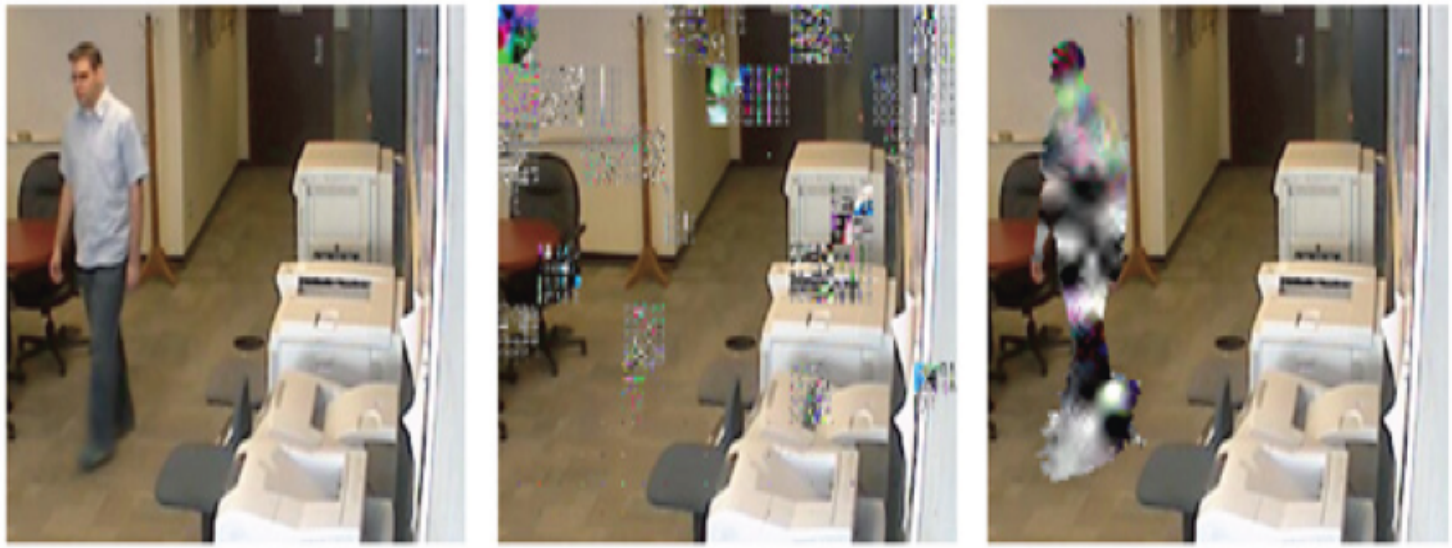


www.ipc.on.ca/images/Findings/mc07-68-ttc.pdf

CCTV Cameras: *Innovative Privacy-Enhancing Approach to Video Surveillance*

- At the University of Toronto, Professor Kostas Plataniotis and Karl Martin have developed a privacy-enhancing approach to video surveillance cameras;
- Their work, as described in *Privacy Protected Surveillance Using Secure Visual Object Coding*, uses cryptographic techniques to secure a private object (a face/image), so that it may only be viewed by designated persons;
- Objects of interest (e.g. a face or body) are stored as completely separate entities from the background surveillance frame, and strongly encrypted.

Innovative Privacy-Enhancing "Transformative" Approach



(a) (b) (c)

Figure (a): original content stream; Figure (b): both shape and texture have been encrypted and despite attempts to hack into this with an incorrect key, the objects of interest could not be decrypted; Figure (c): example where only the texture of the whole body (or only a face for example) is encrypted.

TTC Report:
What the Experts are Saying

"The report is a valuable step forward toward ensuring that video surveillance be carried out in ways that ensure that privacy is protected and that oversight exists."

— Professor Daniel J. Solove, Associate Professor of Law,
George Washington University Law School

"While I understand your report is specifically addressing only the Toronto Transit Commission, it will be invaluable to municipalities throughout the world which are facing similar vexing questions about the proper use and management of video surveillance technologies. Your recommendations provide a principled yet workable model for how to protect individuals' legal and moral right to privacy while also advancing the public's interest in safe, efficient and affordable infrastructure."

— Professor Fred Cate, Distinguished Professor of Law and
Director, Center for Applied Cybersecurity Research

TTC Report:
What the Experts are Saying (Cont'd)

"It sets the bench mark for informed discussion of CCTV in mass transit systems … It provides a roadmap for the most privacy protective approach to CCTV. It offers potential technological solutions that can further enhance privacy with CCTV imagery. It presents specific recommendations and a requirement for an independent third-party audit (this is the Commissioner flexing her muscles). Finally, it demonstrates that … good system design, vigilant oversight, and a commitment to privacy values can result in 'positive-sum' models as Commissioner Cavoukian describes them."

— Murray Long, Editor and Publisher,
PrivacyScan

Joint Project with RIM

IPC is partnering with RIM

in association with

WeCare Home Health Services, Healthanywhere (IgeaCare Systems Inc.), and MedShare to ensure a high level of privacy as well as security, relating to the delivery of innovative home healthcare services.

Pragmatism

Radical Pragmatism

Radical

Radical

(/raedikel/ adj, & n.) — adj.

2) **far-reaching … thorough.**

— Concise Oxford Dictionary, Eighth Edition, 1990.

Radical "Privacy" Pragmatism

Radical Pragmatism
is the embodiment of a
positive-sum paradigm,
invoking the need for
Transformative Technologies
(Trans Tech)

Radical Privacy Pragmatism

Radical = far-reaching … thorough;

Pragmatism ≠ status quo;

Radical Pragmatism (in the area of privacy)
is the embodiment of a positive-sum paradigm,
involving a practical approach,
invoking the need for
Transformative Technologies;

Talk – Action = Zero

Identity, Privacy and Security Initiative
University of Toronto

- As we enter into an age immersed in a rich information environment, frequently sharing information about ourselves and others, can privacy remain a viable option?
- Absolutely, but only if we build it in — architecting it directly into technology.

Dr. Ann Cavoukian

PRIVACY BY DESIGN – "BUILD IT IN"
A CRUCIAL DESIGN PRINCIPLE

Inaugural Lecture of the **Identity, Privacy and Security Initiative (IPSI)**
University of Toronto

What does ubiquitous computing imply for privacy? As we enter into an age where we are immersed in a rich information environment, frequently sharing information about ourselves and others, can privacy remain a viable option? Absolutely, but only if we build it in — architecting it directly into the technology. Dr. Cavoukian, Ontario's Information and Privacy Commissioner and the Chair of the University of Toronto's IPSI Advisory Committee, calls this *privacy by design*. Come and hear her explain how this works as she reviews her efforts to shape the evolution of identity technologies, including identity management systems, radio frequency identifiers and biometrics.

The Identity, Privacy and Security Initiative (IPSI) at the University of Toronto is pleased to announce that Dr. Ann Cavoukian will give the inaugural lecture for a new graduate seminar program on September 17, 2007. This seminar links two new graduate concentrations in privacy and security, offered this fall through the Faculty of Applied Science and Engineering and the Faculty of Information Studies. A key goal of the IPS Initiative is to advance the integration of the basic, social and engineering science research required to generate sustainable solutions to privacy and security.

Please Join Us
September 17th, 2007 – 2:00 - 3:00 p.m.
George Ignatieff Theatre, Trinity College
15 Devonshire Place, Toronto, ON

For more information:

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IPS Initiative
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www.ipsi.utoronto.ca/site4.aspx

A Challenge to the University of Waterloo:

How Can We Work Together?

IPC
www.ipc.on.ca

Conclusions

- We need to change the paradigm away from a zero-sum game to a positive-sum model where both privacy and security are built directly into technologies;
- The use of privacy-enhancing biometrics such as Biometric Encryption will ensure that privacy is protected, while at the same time, delivering strong security – a true win/win scenario – positive-sum, all the way!
- "Radical pragmatism" reflects an effort to embed privacy protective measures, such as privacy by design, into existing technologies and practices, in a positive-sum paradigm;
- Work with us to change the paradigm and think differently: We need both privacy AND security, not "either/or."

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