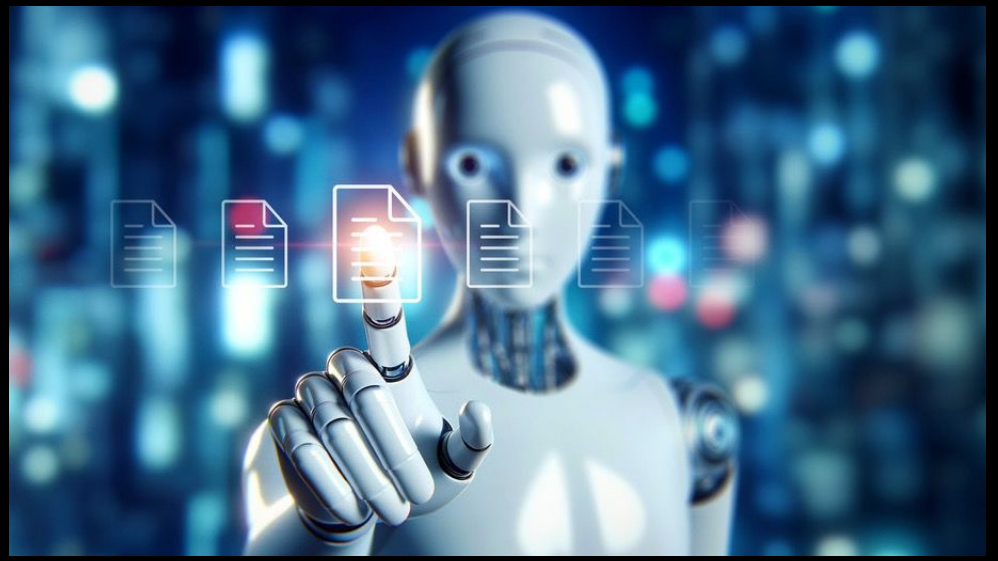
LEAN COMPLIANCE

ISO 42001: BUILDING TRUST THROUGH SAFE AND RESPONSIBLE AI

ELEVATE COMPLIANCE WEBINARS

Raimund Laqua, PMP, P.Eng
ray.laqua@leancompliance.ca



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LEAN COMPLIANCE

Our mission

LEAN COMPLIANCE



1. Our mission is to ensure your mission success through compliance.
2. We work with forward-looking, ethical organizations who take their obligations seriously and strive to continually raise their standards.
3. We specialize in Operational Compliance; compliance that works and delivers benefits.
4. We introduce proactive and integrative strategies to elevate compliance above reactive cycles that hold organizations back from compliance success.
5. We help eliminate waste introduced by not meeting your obligations or keeping your promises.
6. We help compliance be more than the sum of its parts.

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THE BIG IDEA

Can you hear the music?



Niels Bohr: Algebra is like sheet music, the important thing isn't can you read music, it's can you hear it.

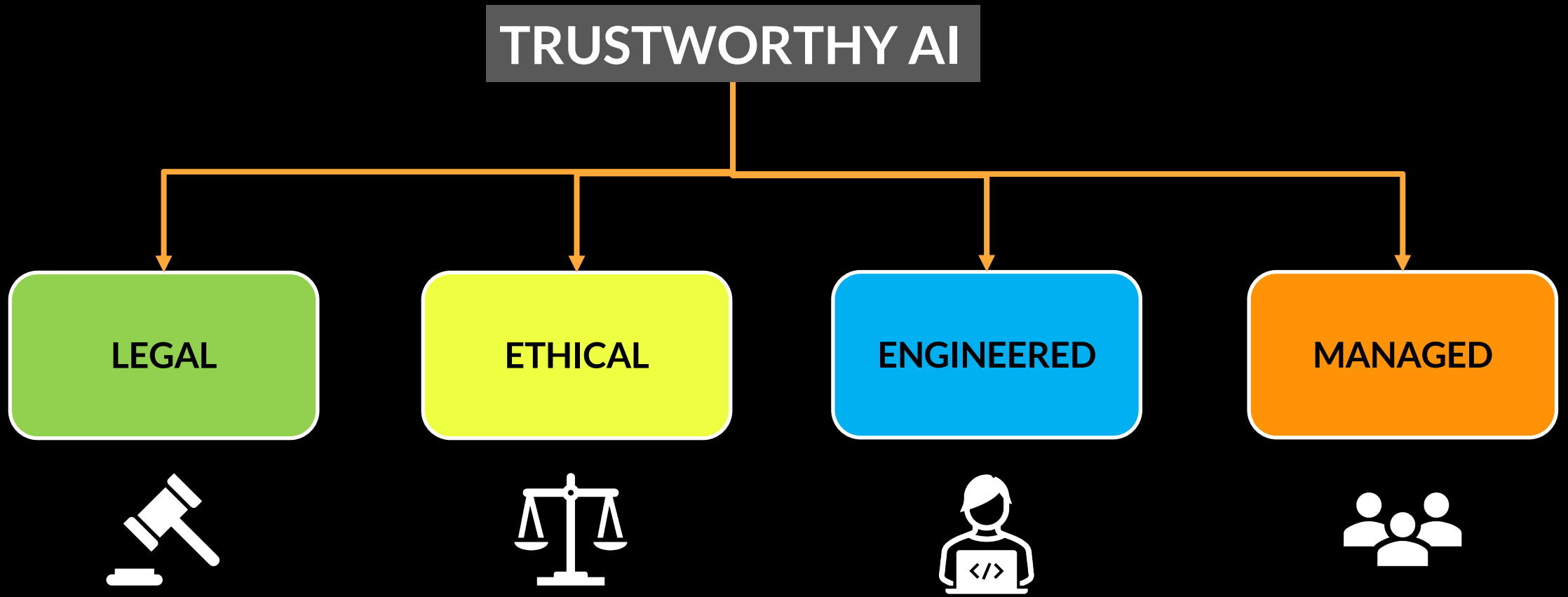
Can you hear the music, Robert?

J. Robert Oppenheimer: Yes, I can.

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THE BIG IDEA

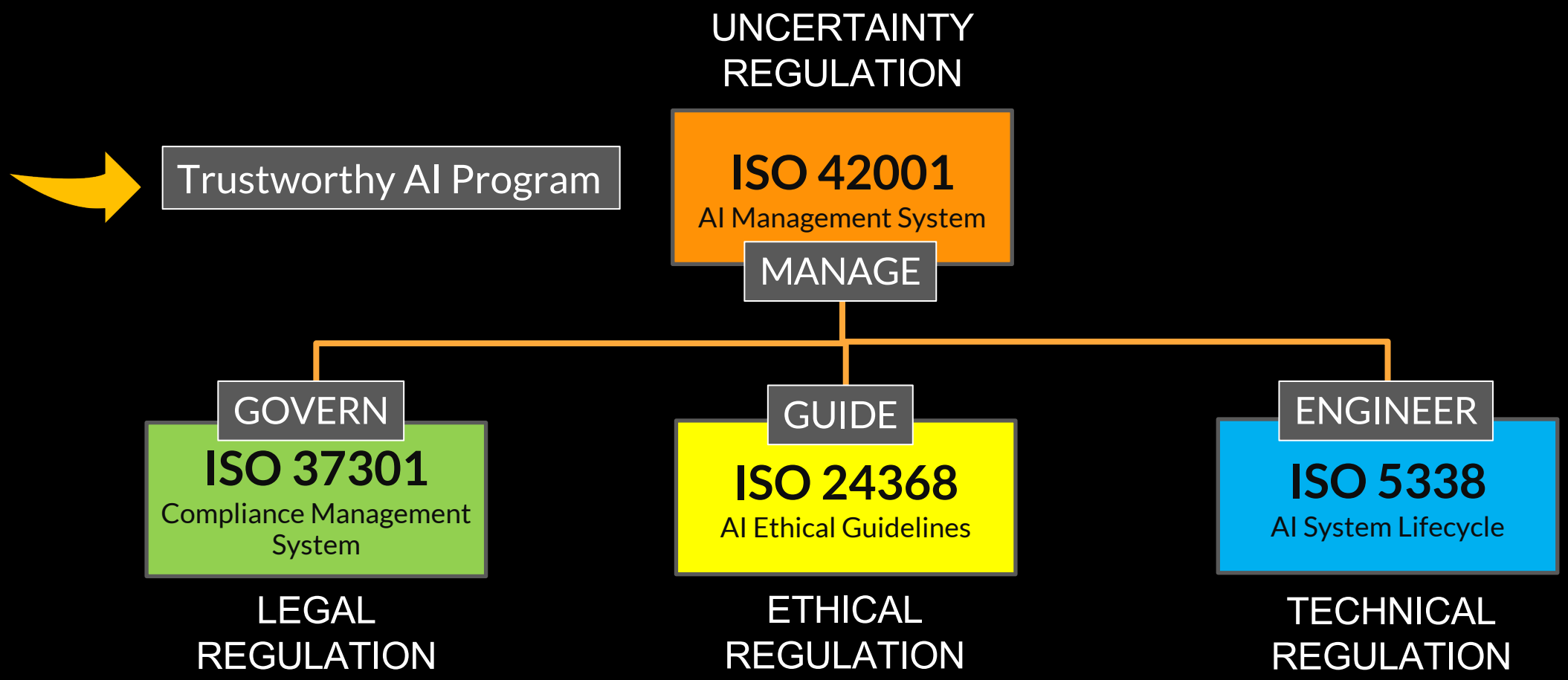
For AI to be trustworthy, it needs to be legal, ethical, engineered, and managed.



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THE BIG IDEA

ISO 42001, along with the support from a few other standards, will help you build AI you can trust



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LEAN COMPLIANCE

OUTLINE

What we will cover today

1. What is AI?
2. Why AI is not Trustworthy
3. What is Needed to Build Trust
4. How to use ISO 42001 to Build Trust

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LEAN COMPLIANCE

1. WHAT IS AI?

The elephant in the room



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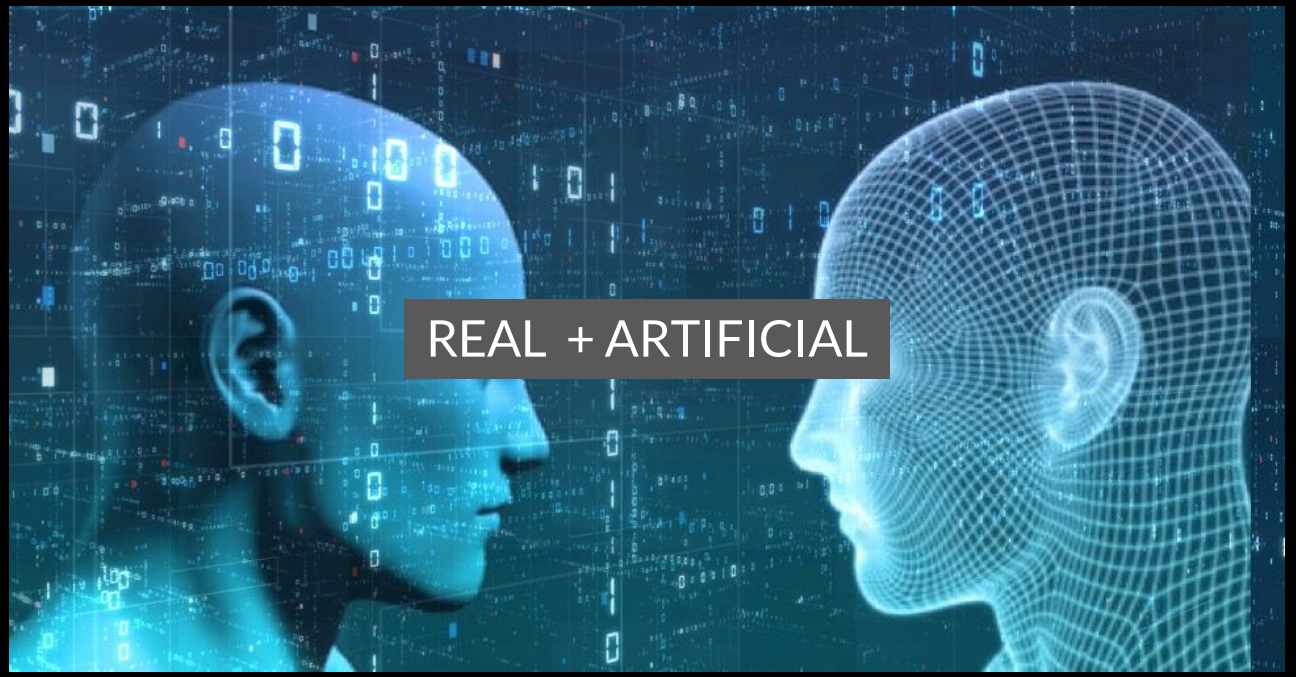
WHAT IS AI?

#1 - Defining AI by our aspirations

REAL LIFE

REAL INTELLGENCE

REAL WORLD



ARTIFICIAL LIFE

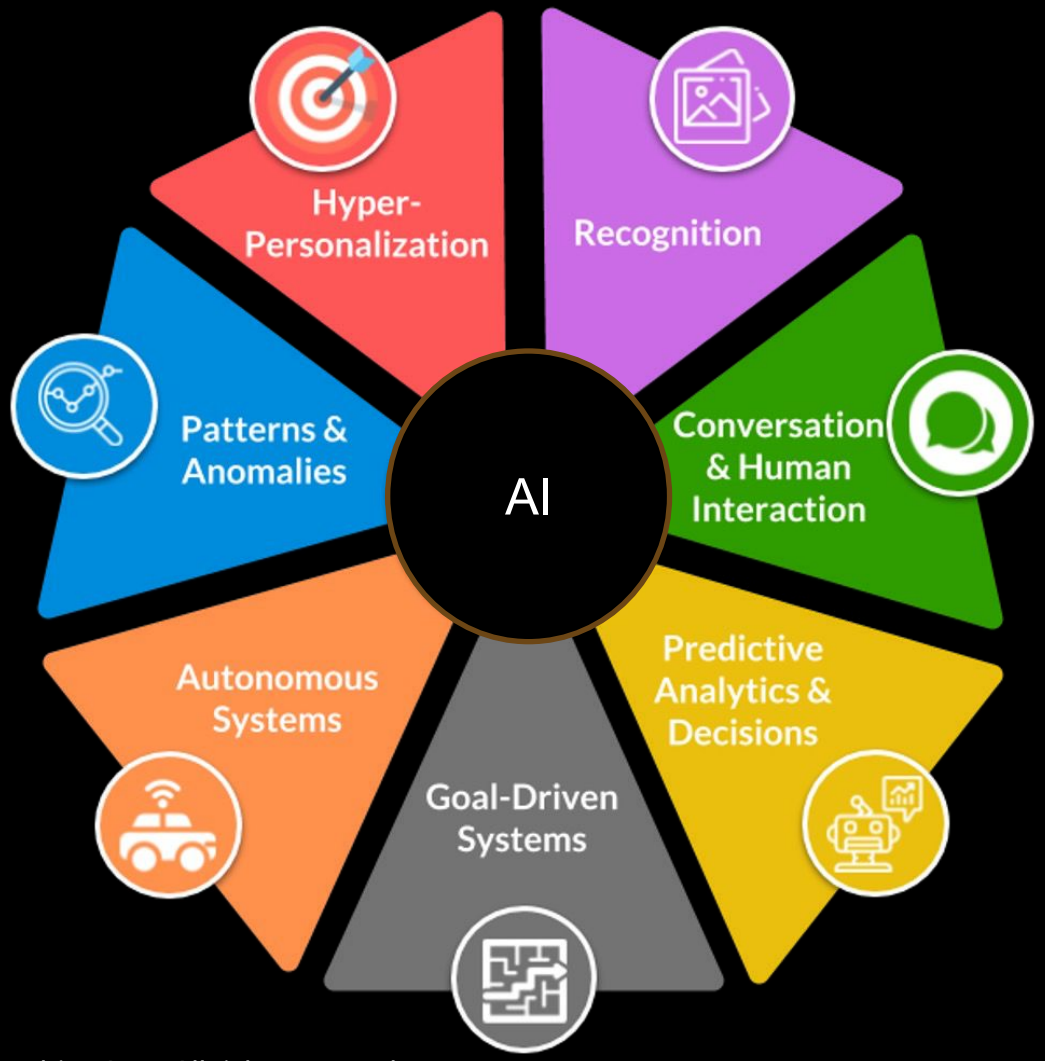
ARTIFICAL INTELLIGENCE

ARTIFICIAL WORLD

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WHAT IS AI?

#2 - Defining AI by its applications



ChatGPT

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WHAT IS AI?

#3 - Defining AI by its impact (positive, negative, and somewhere in between)



AI will …

- Solve critical challenges facing the world: healthcare, climate change, economic growth, etc.
- Eliminate jobs, and businesses
- Transform the nature of work
- Create new jobs, technologies, and opportunities
- Attack businesses, organizations, critical infrastructure, and governments
- Increase surveillance and monitoring
- Accelerate the creation of gene editing tools
- Turn businesses into autonomous robots
- Increase data center energy consumption
- Redirect funding away from other research

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WHAT IS AI?

#4 - Defining AI by its predictions



AI is a stochastic engine, it ‘s a probabilistic machine.

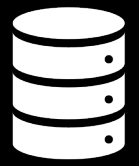
AI processes data about the world to make predictions about that world with a measure of uncertainty.

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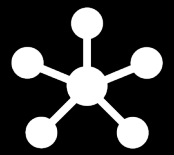
WHAT IS AI?

#5 - Defining AI by its capabilities

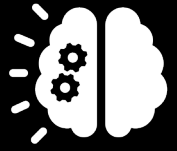
DATA STORAGE → **KNOWLEDGE MODEL** → **INFERENCE ENGINE** → **INTELLIGENT AGENT** → **ADAPTIVE AGENT**



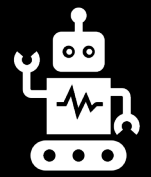
Data Processing



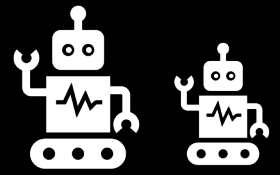
Machine Learning



Artificial Intelligence



Agentic AI

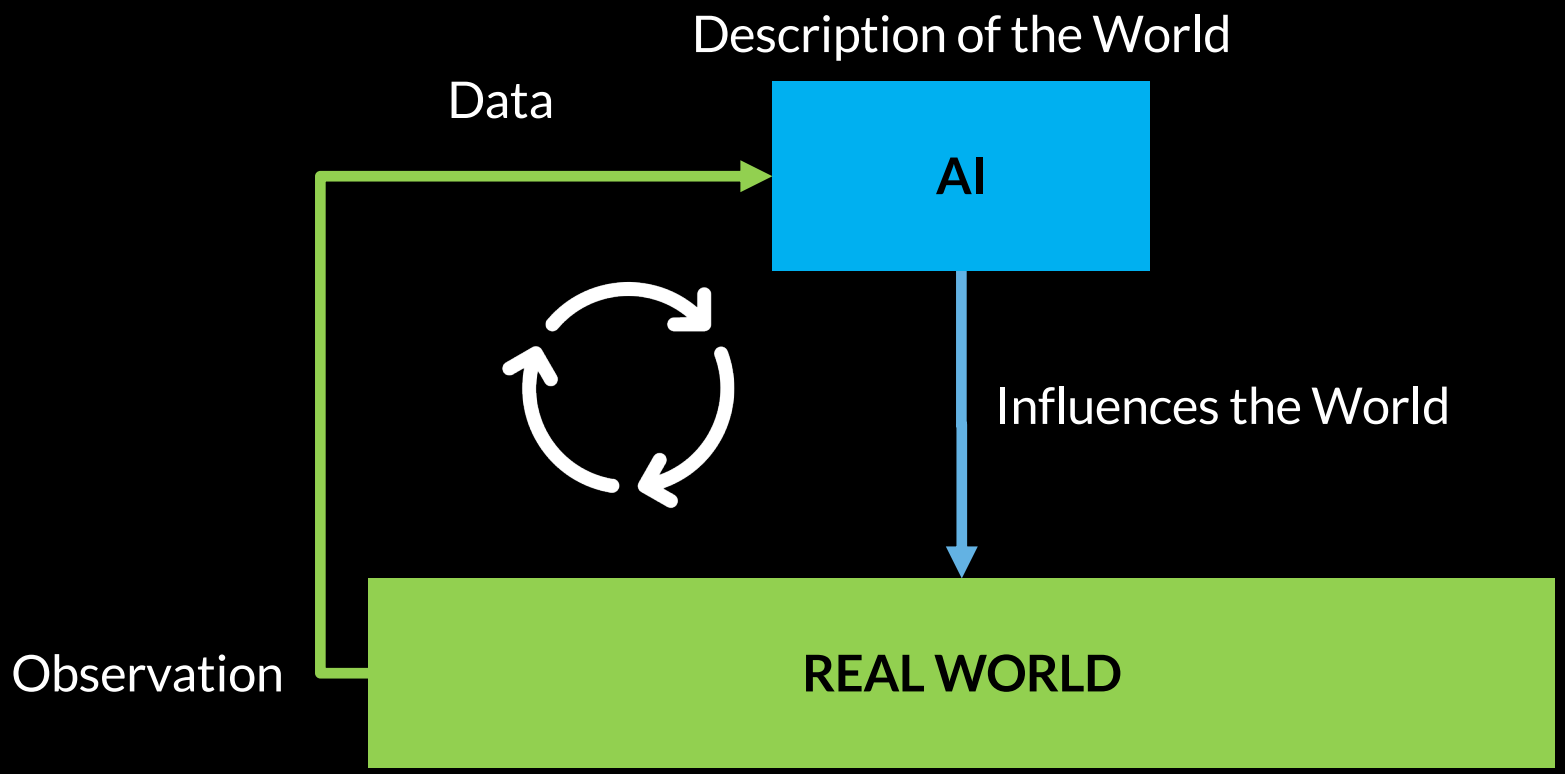


Autopoietic AI

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WHAT IS AI?

#6 - Defining AI by its relationship with the world



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WHAT IS AI?

How do we define AI?

What makes AI unique?



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WHAT IS AI?

#7 - Defining AI by its unique characteristics



1. AI is a stochastic machine
2. AI can learn
3. AI can learn how to learn
4. AI has agency in the world

We need to re-think how we govern, manage, and use technology

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LEAN COMPLIANCE

2. WHY AI IS NOT TRUSTWORTHY

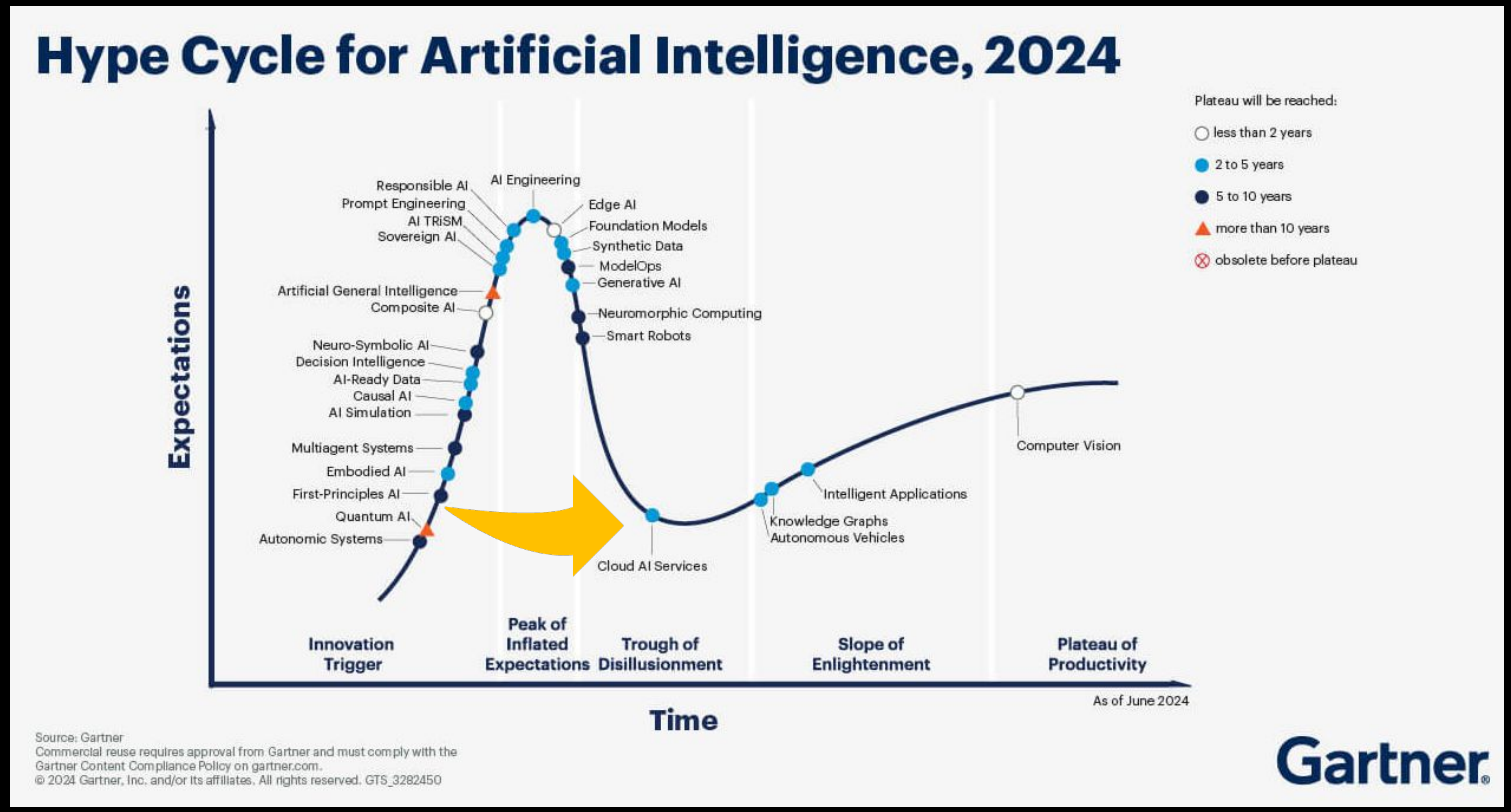
Can AI be good?

> *It is impossible to design a system so perfect that no one needs to be good.*
>
> *– T.S. Eliot*

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WHY AI IS NOT TRUSTWORTHY

#1 – We don't trust the hype

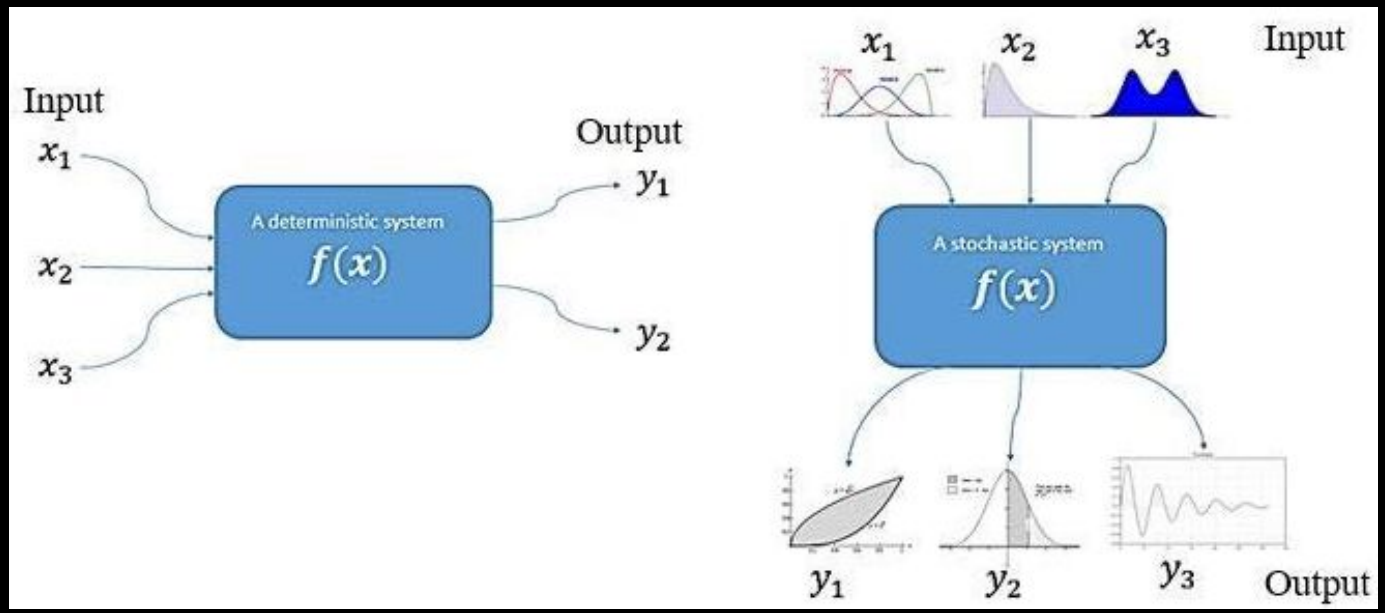


We must manage our expectations

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WHY AI IS NOT TRUSTWORTHY

#2 – We don't trust AIs predictions

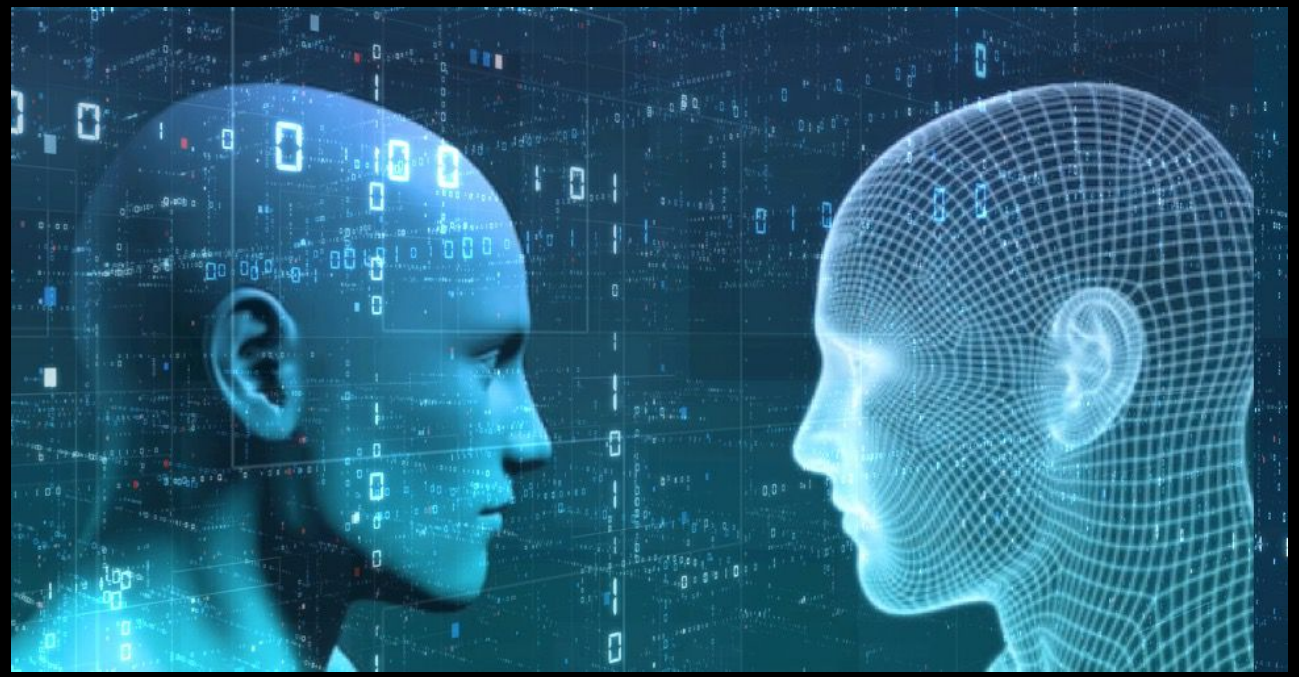


We need to be comfortable with uncertainty

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WHY AI IS NOT TRUSTWORTHY

#3 – We don't trust anthropomorphisms about AI



- AI thinks
- AI lies
- AI hallucinates
- AI feels
- AI cheats
- AI reasons
- AI lives

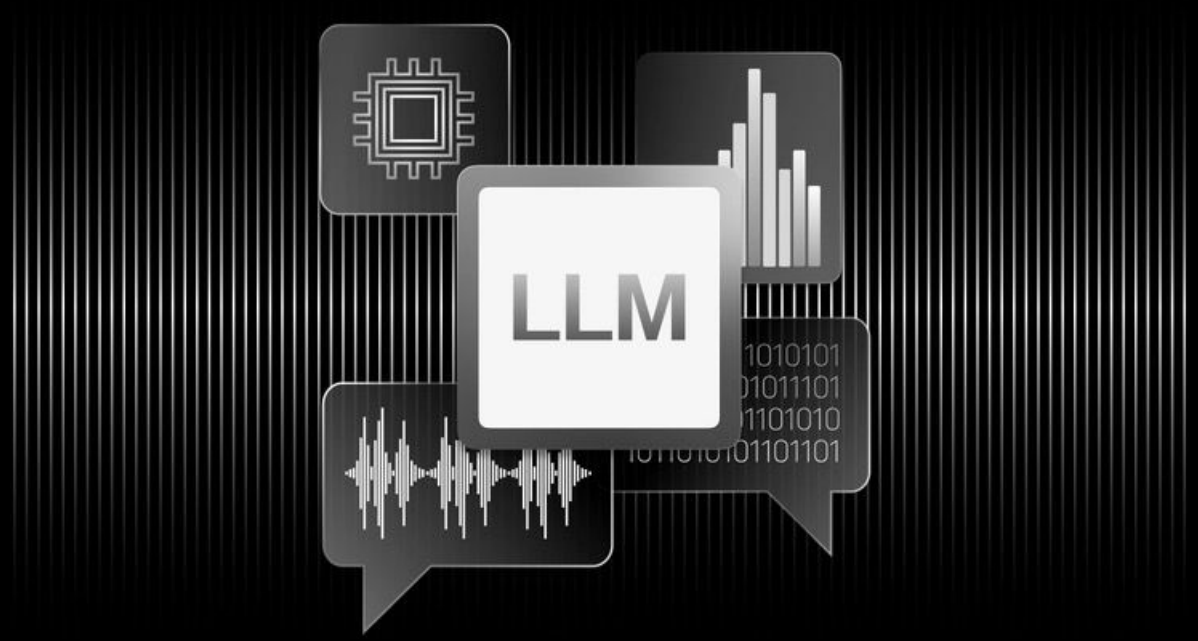
We need to manage AI as it is, not what we want it be

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WHY AI IS NOT TRUSTWORTHY

#4 – We don't trust models

All models are wrong, some are useful



LLMs are not reliable, and not valid

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WHY AI IS NOT TRUSTWORTHY

#5 – We don't trust AI to be ethical

Ashby's Cybernetics Law of Inevitable Ethical Inadequacy

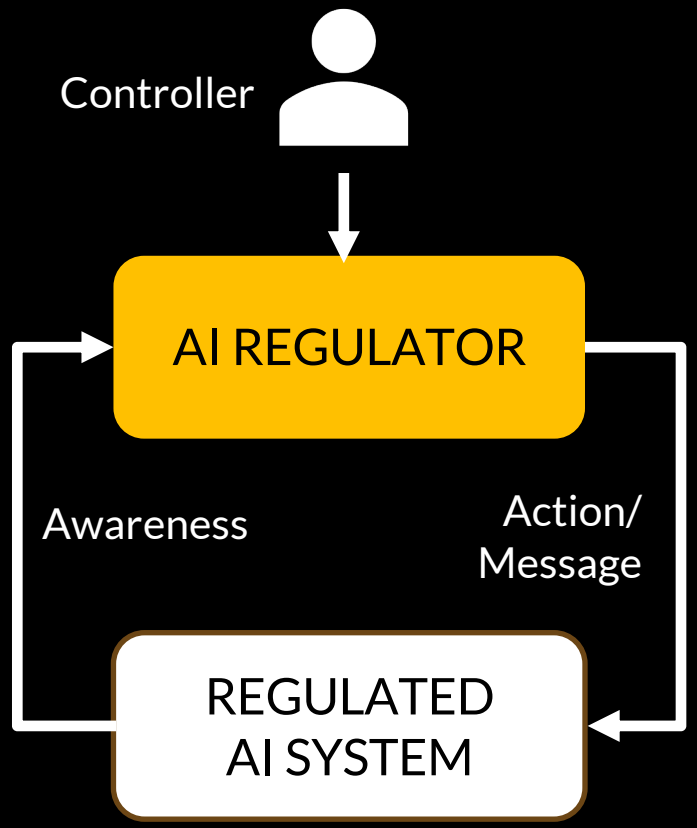
If you don't specify that you require a secure ethical system, what you get is an insecure unethical system.

Unless a system specifies ethical goals,
it will regulate away from being ethical towards other goals.

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WHY AI IS NOT TRUSTWORTHY

#6- We don't trust AI to be effectively regulated by paper-based policies, and management systems



- **Good Regulator Theorem** – the AI Regulator needs to be a model of the system under regulation.
- **Law of Requisite Variety** – the AI Regulator needs to have more variety than the system it is regulating.
- **Law of Inevitable Ethical Inadequacy** – the AI Regulator must include ethical requirements or the system under regulation will behave unethically.
- **Red Queen Principle** – the AI Regulator needs to continually advance its capabilities (not just fix what is broken).
- **Ethical Regulator Theorem** – the AI Regulator must be transparent, have prioritized ethical goals, and function with integrity.

We need to be intelligent about how we manage and use AI

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LEAN COMPLIANCE

3. WHAT IS NEEDED TO BUILD TRUST

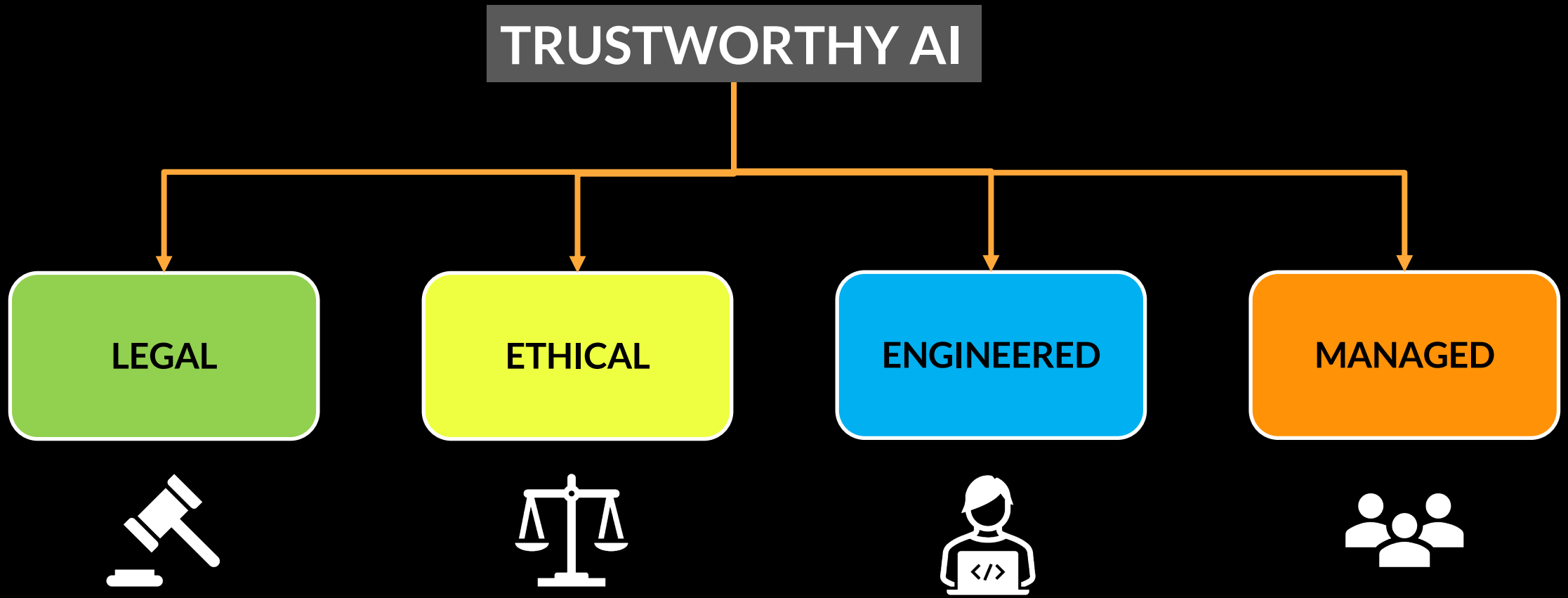
Trust needs to be earned before it is given



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WHAT IS NEEDED TO BUILD TRUST

For AI to be trustworthy, it needs to be legal, ethical, engineered, and managed.



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WHAT IS NEEDED TO BUILD TRUST

For AI to be trustworthy, it needs to be legal, ethical, engineered, and managed.

GUIDE



ETHICAL REGULATION

AI Code of Ethics

AI Engineering Standard



TECHNICAL REGULATION

ENGINEER

GOVERN



LEGAL REGULATION

AI Regulation and Standards

AI Management System



UNCERTAINTY REGULATION

MANAGE

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WHAT IS NEEDED TO BUILD TRUST

Legal license to operate



Govern

- **European Union's AI Act (proposed in 2021):** This was a comprehensive attempt to regulate AI systems based on their risk level. It was still under negotiation as of early 2024.
- **China's AI regulations:** China implemented several regulations, including the "Interim Measures for the Management of Generative AI Services" in 2023.
- **U.S. AI Bill of Rights (2022):** While not legally binding, this outlined five principles for the design, use, and deployment of AI systems.
- **EU's Digital Services Act and Digital Markets Act (2022**): These regulations, while not specifically about AI, have implications for AI-driven platforms and services.
- **NIST AI Risk Management Framework (2023):** The U.S. National Institute of Standards and Technology released this voluntary framework to help organizations address AI risks.
- **Various state-level regulations in the U.S.:** For example, laws regarding facial recognition technology and automated decision systems.
- **Canada's Artificial Intelligence and Data Act (proposed in 2022):** This was part of broader legislation aimed at regulating high-impact AI systems.
- **ISO/IEC 42001:2023 - Artificial intelligence — Management system**: Published in February 2023, this international standard provides a framework for organizations to develop and maintain an Artificial Intelligence Management System (AIMS).

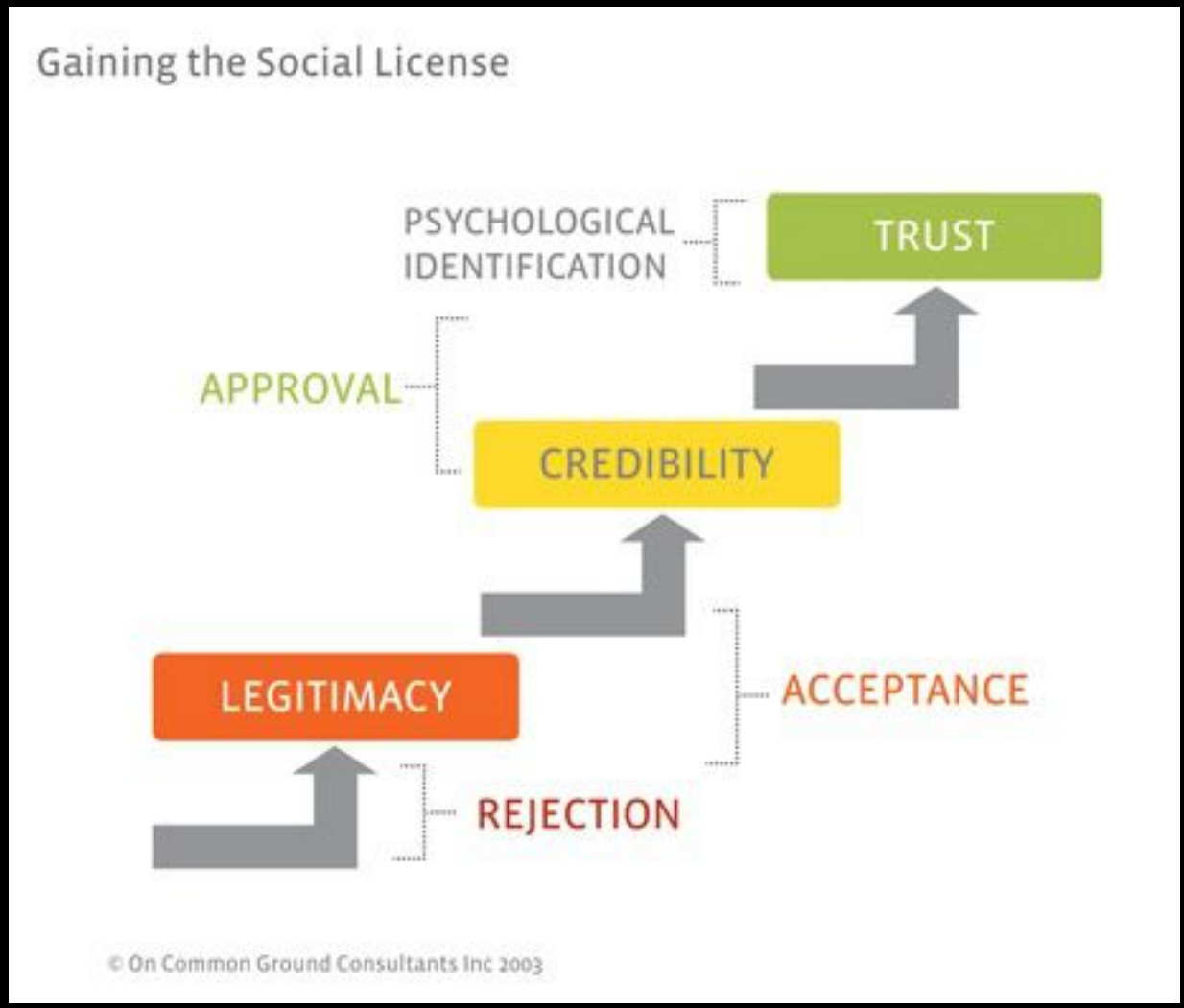
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WHAT IS NEEDED TO BUILD TRUST

Social/Ethical license to operate



Guide



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WHAT IS NEEDED TO BUILD TRUST

Engineers need a License to practice (Professional AI Engineers)



Engineer

Engineers Canada defines the practice of engineering as an activity where all three of these elements are present:

1. Any of various particular intellectual activities or combinations of them, including:

- Planning
- Designing
- Composing
- Evaluating
- Advising
- Reporting
- Directing or supervising
- Managing any of the above

2. The application of engineering principles, and

3. Safeguarding societal interests, such as:

- Life
- Health
- Property
- Economic interests
- The public welfare or the environment

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WHAT IS NEEDED TO BUILD TRUST

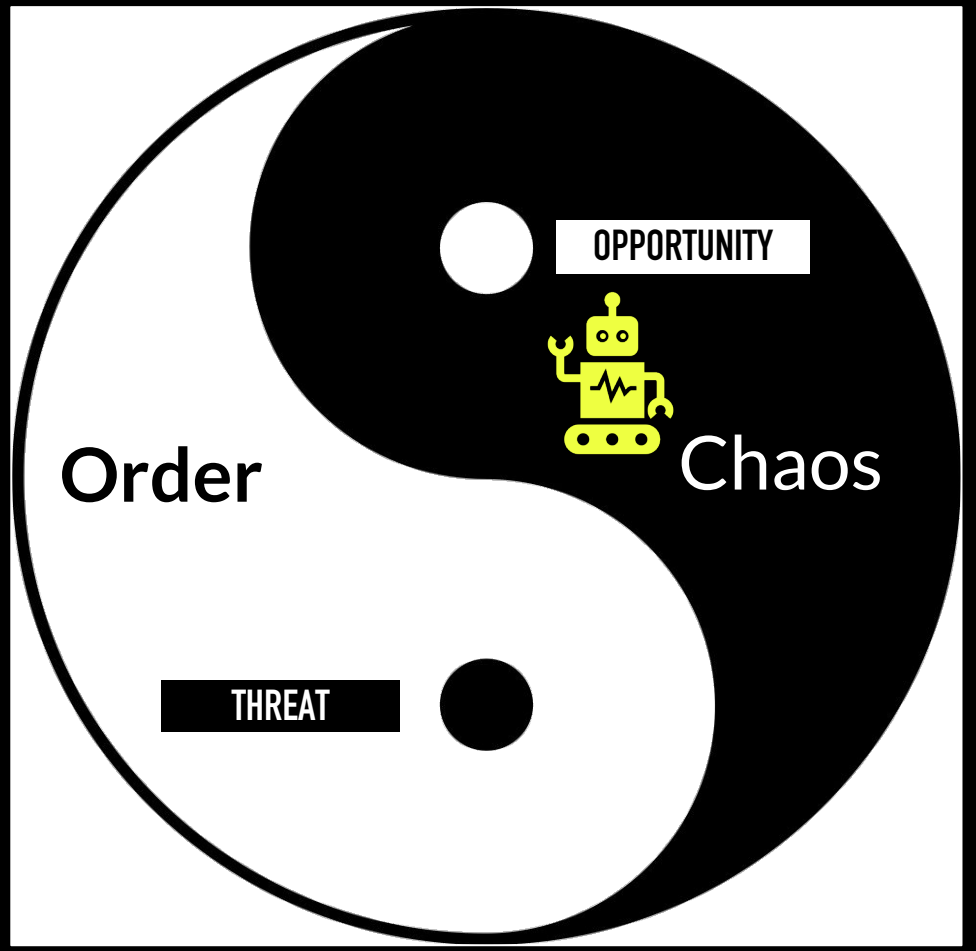
AI needs to managed (we need to make certain)



Manage

ORDER

- The place you are when what you do works
- Predictable
- Occasional chaos
- Deterministic
- Routine
- Underwhelming



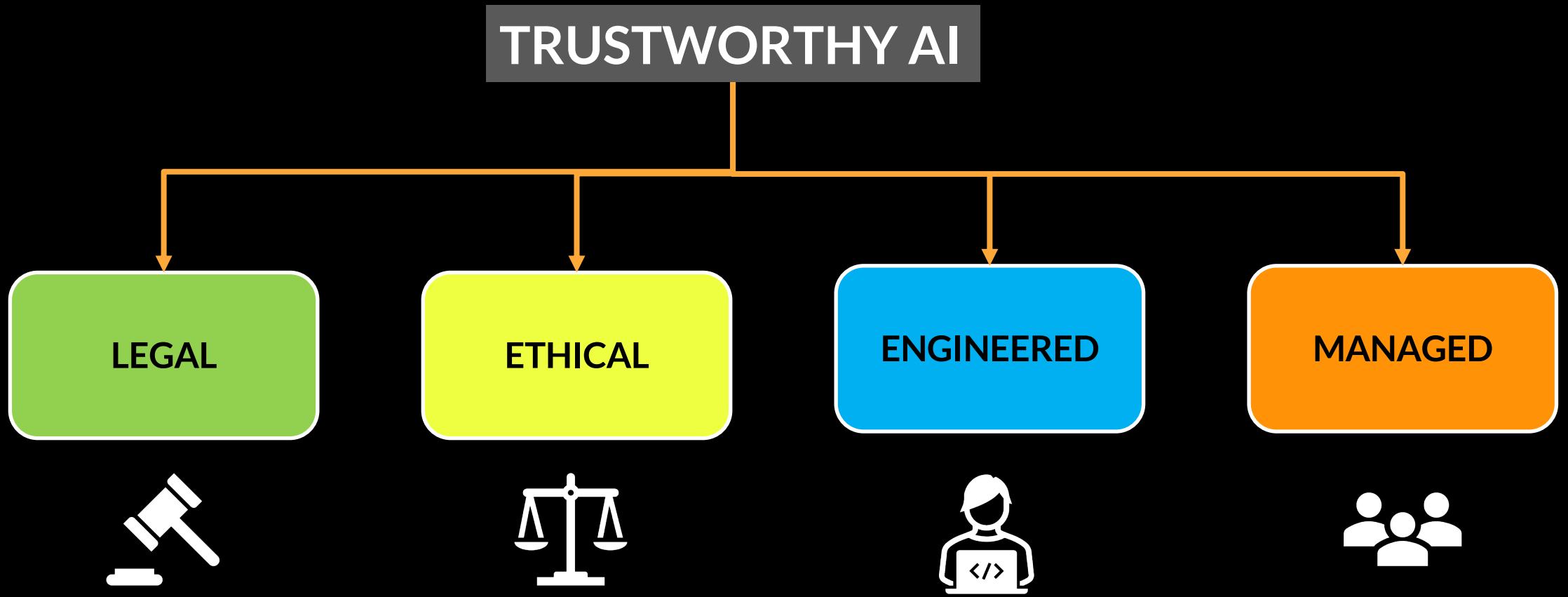
CHAOS

- The place you are when what you do doesn't work
- Unpredictable
- Occasional order
- Random
- Abnormal
- Overwhelming

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WHAT IS NEEDED TO BUILD TRUST

For AI to be trustworthy, it needs to be legal, ethical, engineered, and managed.



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4. HOW TO USE ISO 42001 TO BUILD TRUST

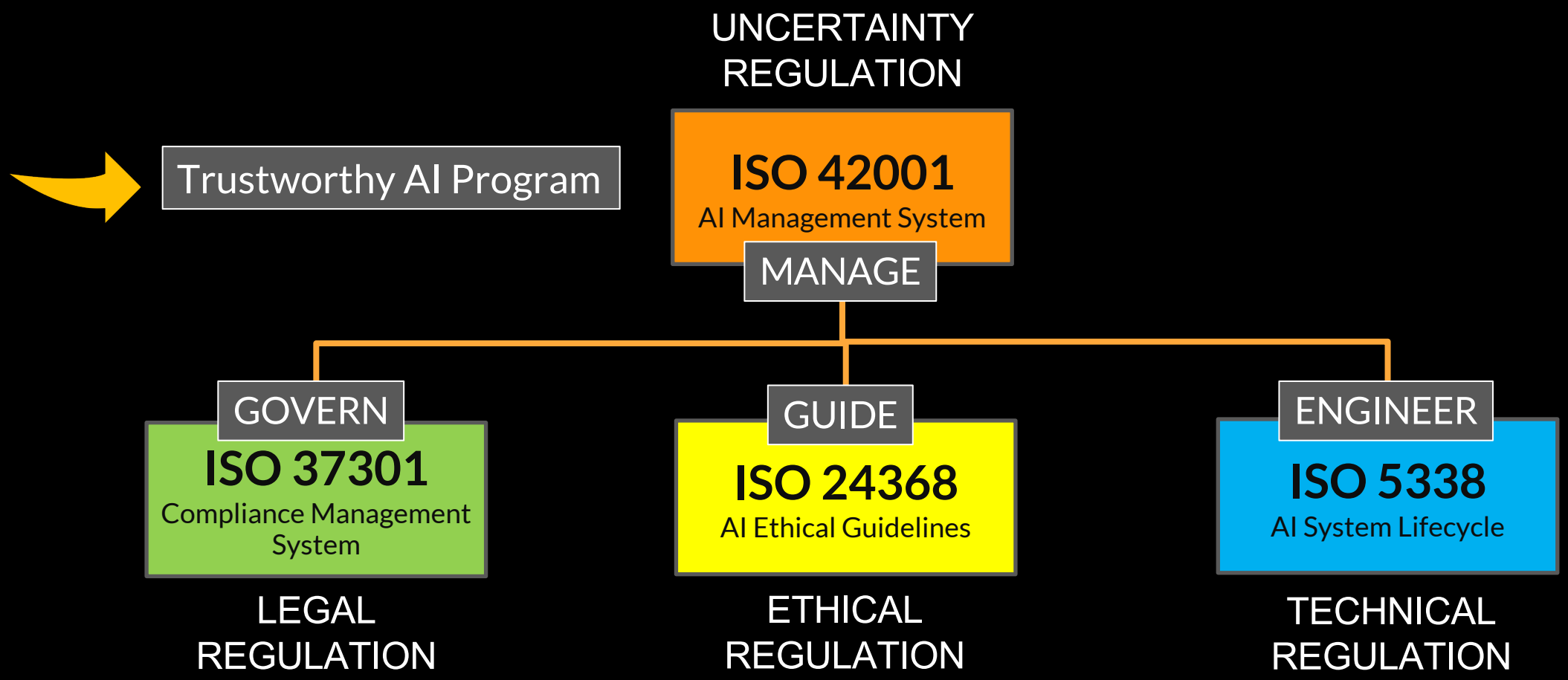
With a little help from its friends



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HOW TO USE ISO 42001 TO BUILD TRUST

Use ISO 42001 as a Trustworthy AI Program



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HOW TO USE ISO 42001 TO BUILD TRUST

Overview of ISO 42001 (AIMS)

ISO 42001
AI Management System

MANAGE

AI Management Requirements

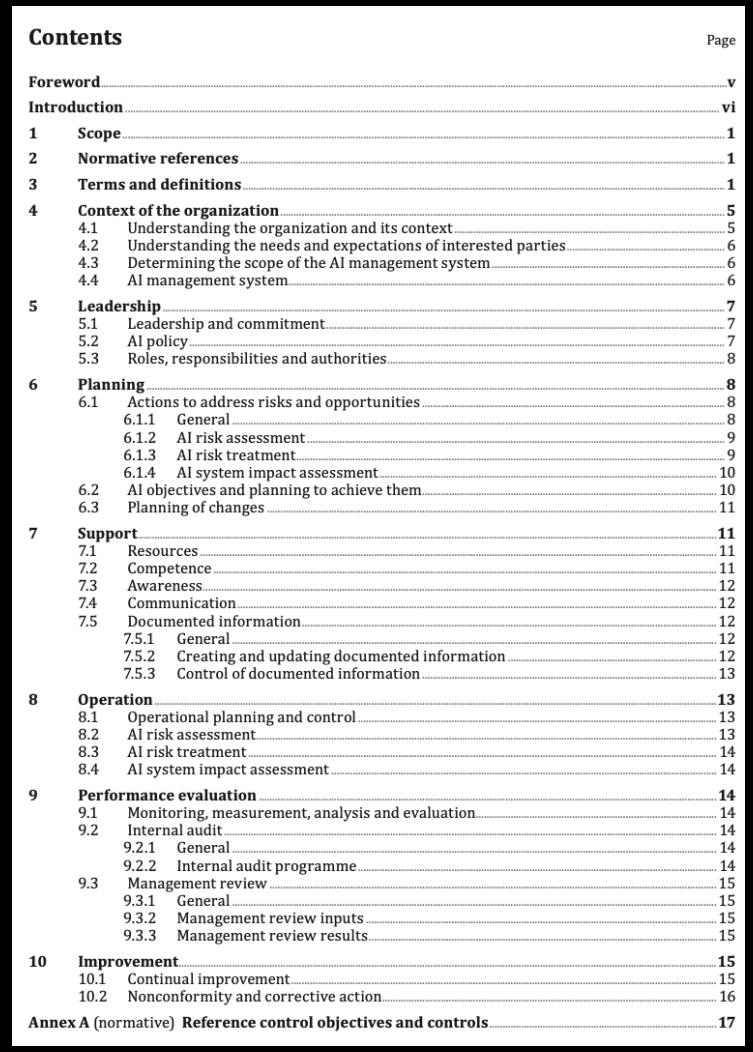


INTERNATIONAL STANDARD

ISO/IEC 42001:2023

Edition 1
2023-12

Information technology — Artificial intelligence — Management system



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HOW TO USE ISO 42001 TO BUILD TRUST

ISO 42001 - Purpose

ISO 42001
AI Management System

MANAGE

This document intends to help organizations responsibly perform their role with respect to AI systems (e.g. to use, develop, monitor or provide products or services that utilize AI). AI potentially raises specific considerations such as:

— The use of AI for automatic decision-making, sometimes in a non-transparent and non-explainable way, can require specific management beyond the management of classical IT systems.

— The use of data analysis, insight and machine learning, rather than human-coded logic to design systems, both increases the application opportunities for AI systems and changes the way that such systems are developed, justified and deployed.

— AI systems that perform continuous learning change their behaviour during use. They require special consideration to ensure their responsible use continues with changing behaviour.

ISO 42001 requires new and specific considerations

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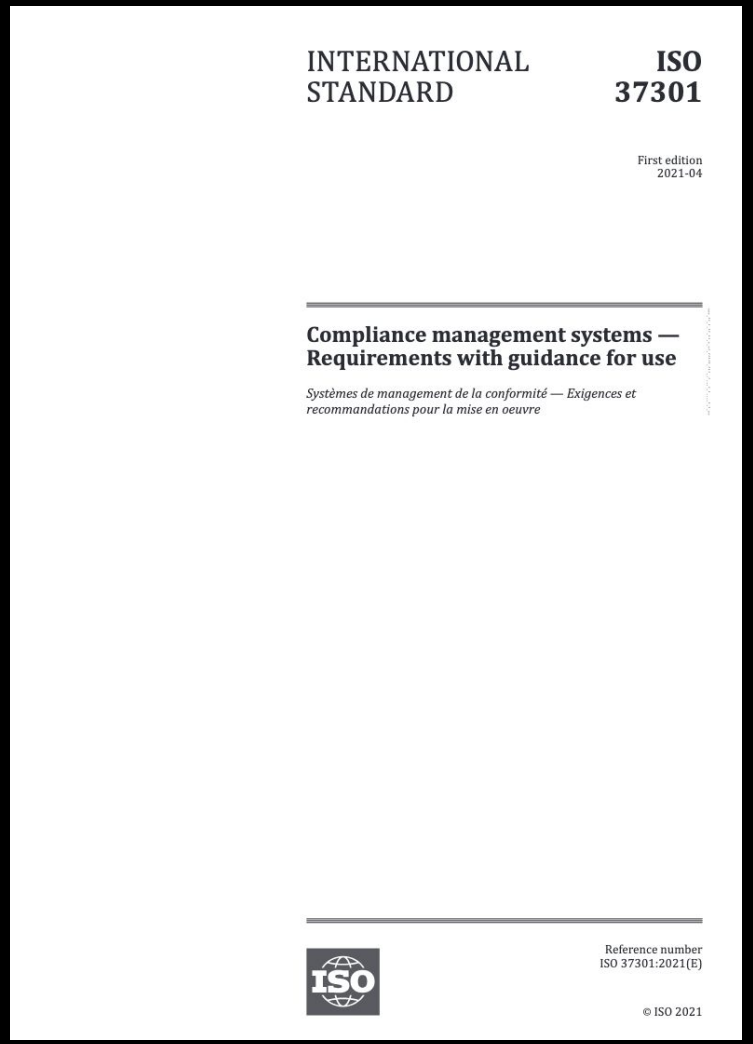
HOW TO USE ISO 42001 TO BUILD TRUST

Overview of ISO 32701 (CMS)

ISO 32701
Compliance Management System

GOVERN

AI Compliance Requirements



INTERNATIONAL STANDARD

ISO 37301

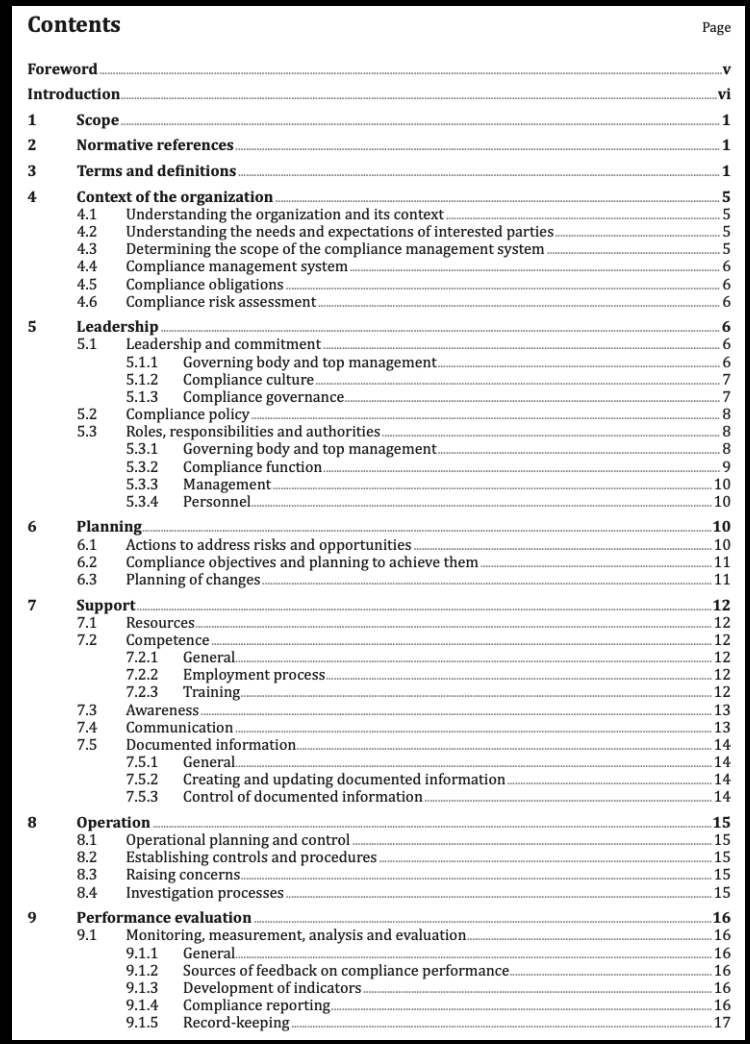
First edition
2021-04

Compliance management systems — Requirements with guidance for use

Systèmes de management de la conformité — Exigences et recommandations pour la mise en oeuvre

Reference number
ISO 37301:2021(E)

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HOW TO USE ISO 42001 TO BUILD TRUST

Overview of ISO 24368 (AI Ethics)

ISO 24368
AI Ethical Guidelines

GUIDE

AI Code of Ethics



TECHNICAL REPORT

ISO/IEC TR 24368

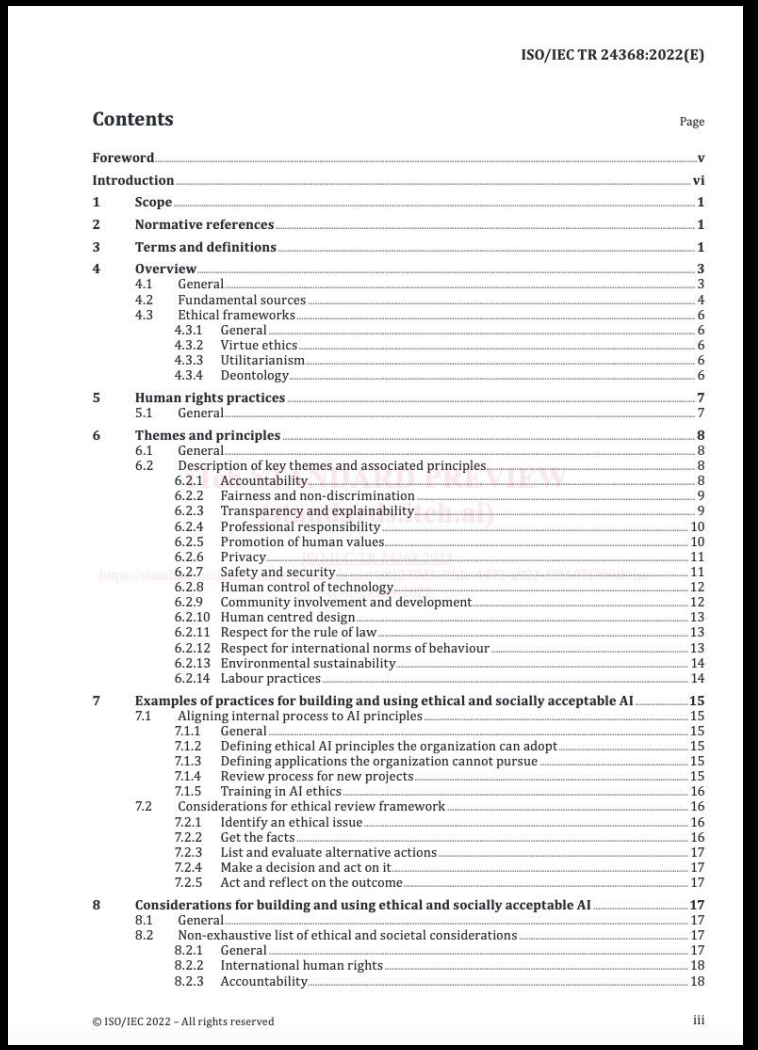
First edition
2022-08

Information technology — Artificial intelligence — Overview of ethical and societal concerns

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO/IEC TR 24368:2022
https://standards.iteh.ai/catalog/standards/sist/e8123943-33de-4472-a922-5f55073008f8/iso-iec-tr-24368-2022

Reference number
ISO/IEC TR 24368:2022(E)

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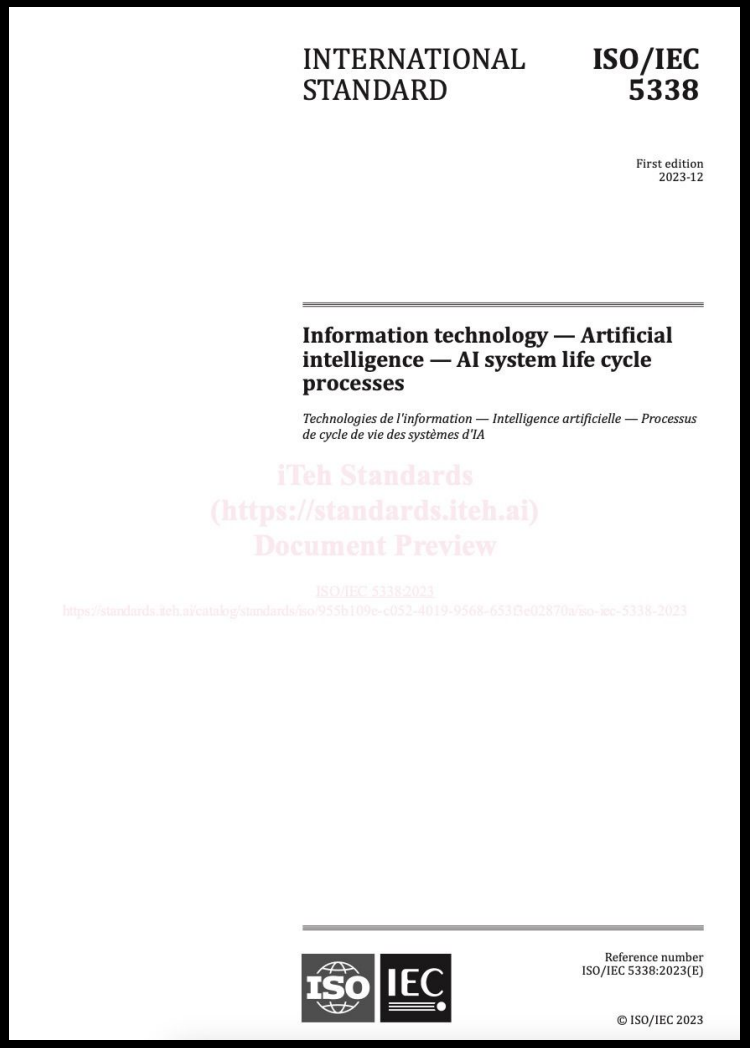
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Overview of ISO 5338

ISO 5338
AI System Lifecycle

ENGINEER

AI System Technical Requirements



INTERNATIONAL STANDARD

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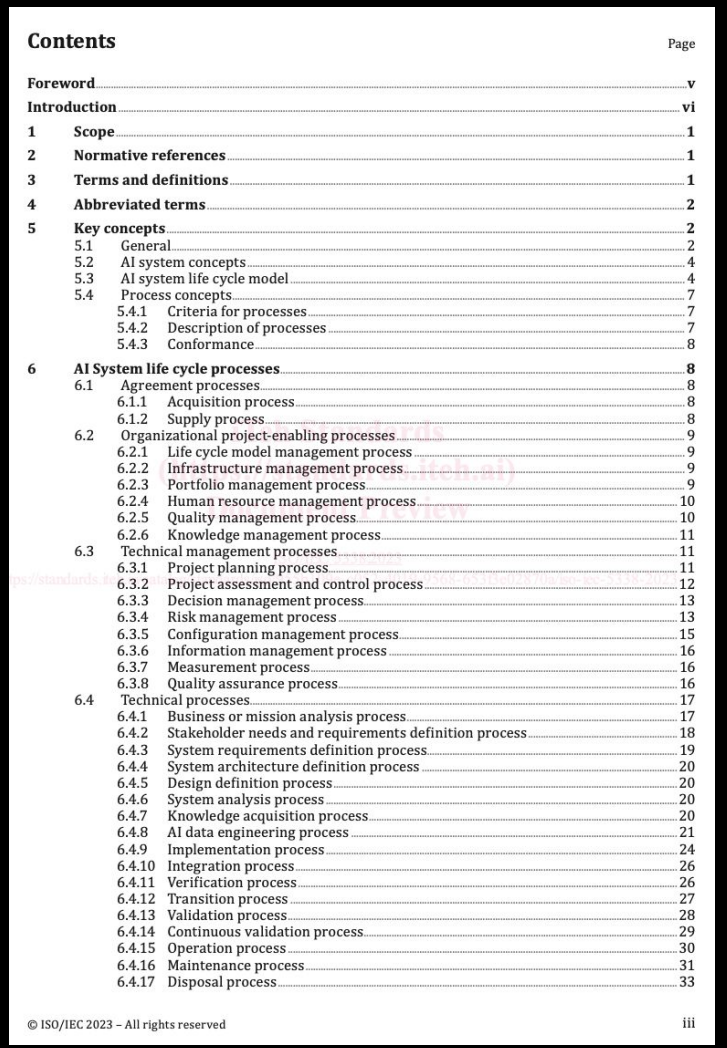
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ISO 5338 - Purpose

ISO 5338
AI System Lifecycle

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This document defines a set of processes and associated concepts for describing the life cycle of AI systems based on machine learning and heuristic systems. It is based on ISO/IEC/IEEE 15288 and ISO/IEC/IEEE 12207 with modifications and additions of AI-specific processes from ISO/IEC 22989 and ISO/IEC 23053.

This document provides processes that support the definition, control, management, execution and improvement of the AI system in its life cycle stages. These processes can also be used within an organization or a project when developing or acquiring AI systems. When an element of an AI system is traditional software or a traditional system, the software life cycle processes in ISO/IEC/IEEE 12207 and the system life cycle processes in ISO/IEC/IEEE 15288 can be used to implement that element.

ISO 5338 extends traditional software development cycle (SDLC) to support AI

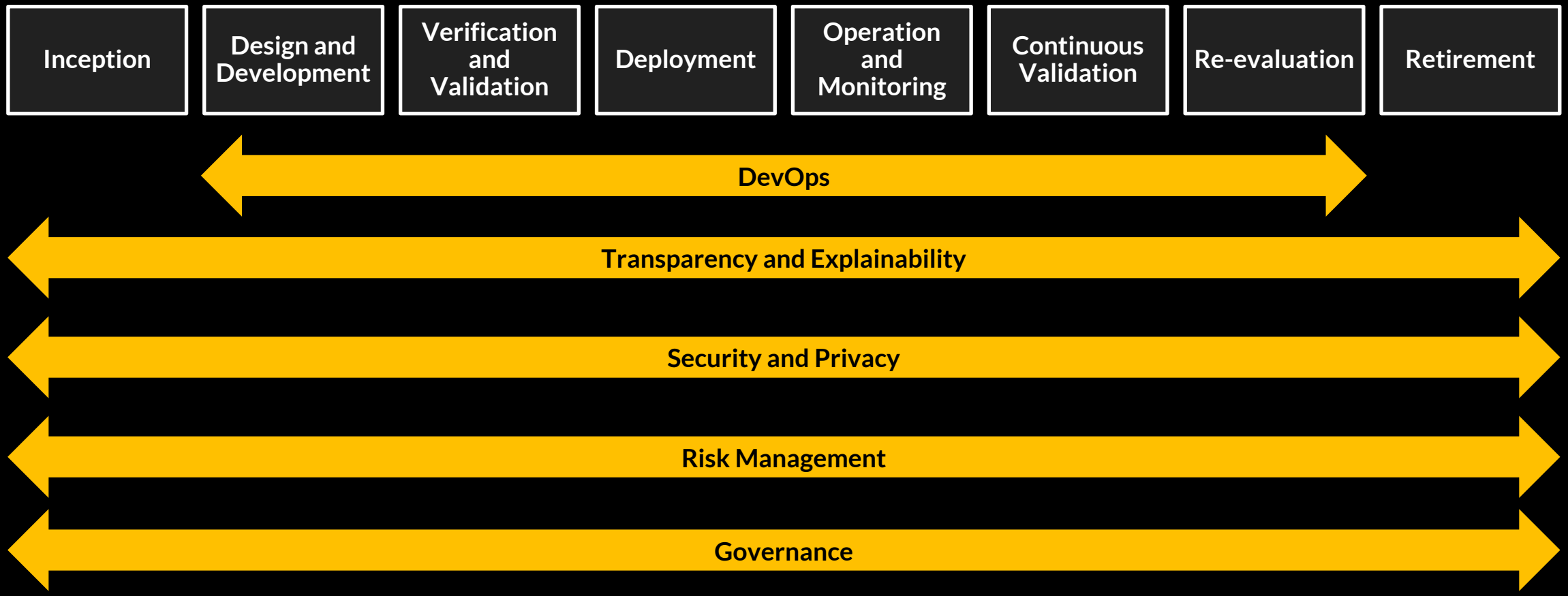
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ISO 5338– AI system lifecycle stages and key processes

ISO 5338
AI System Lifecycle

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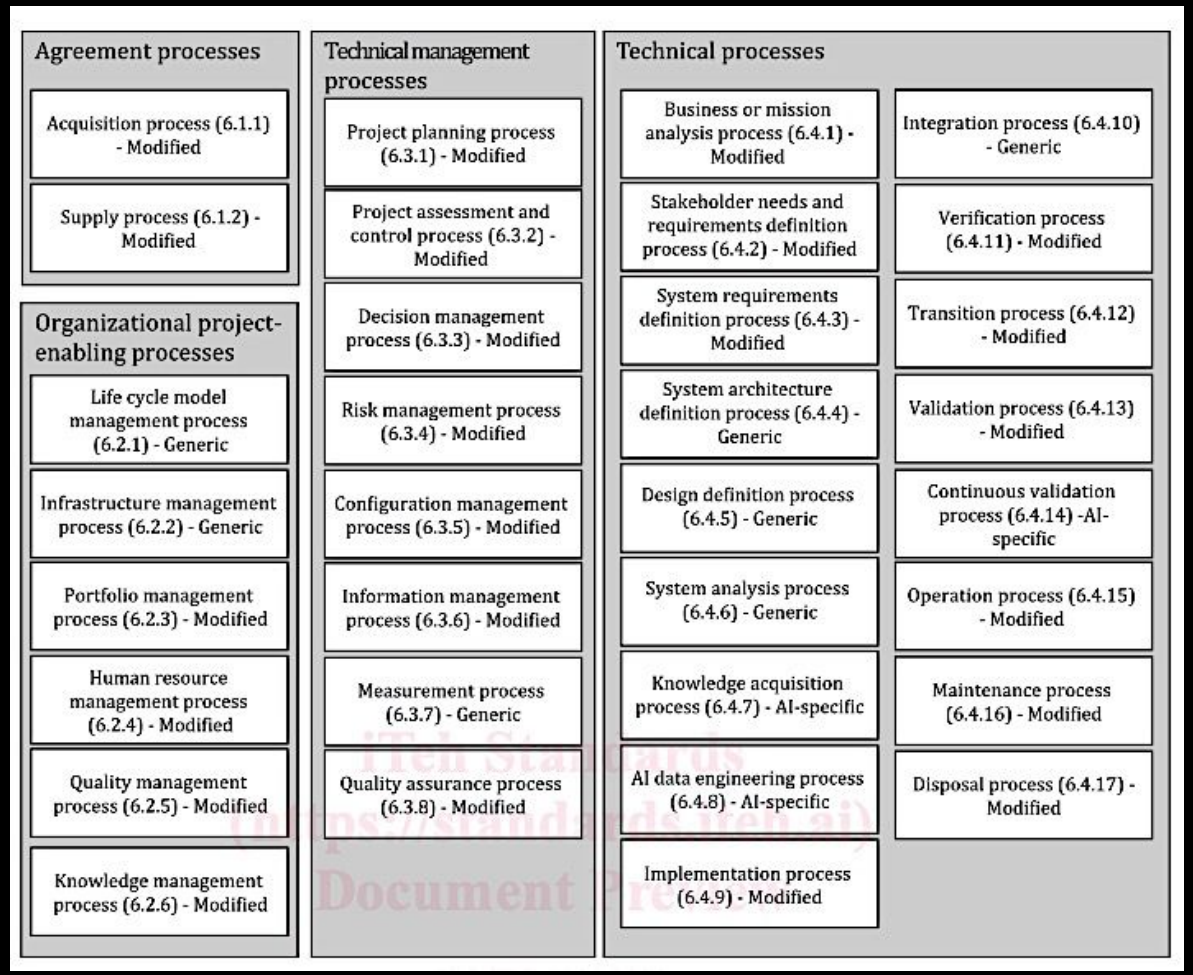
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ISO 5338 - Process Overview

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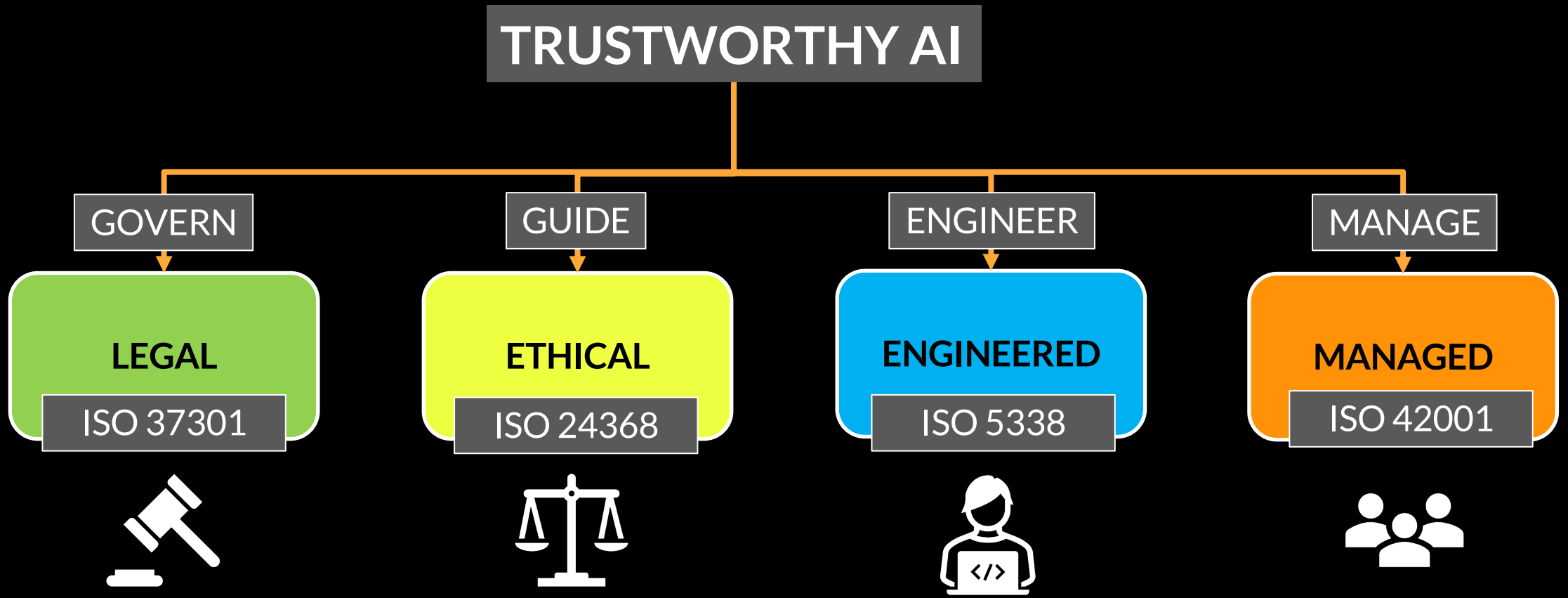


- Agreement processes
- Organizational project-enabling processes
- Technical management processes
- Technical processes

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For AI to be trustworthy, it needs to be legal, ethical, engineered, and managed.



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Q&A



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