



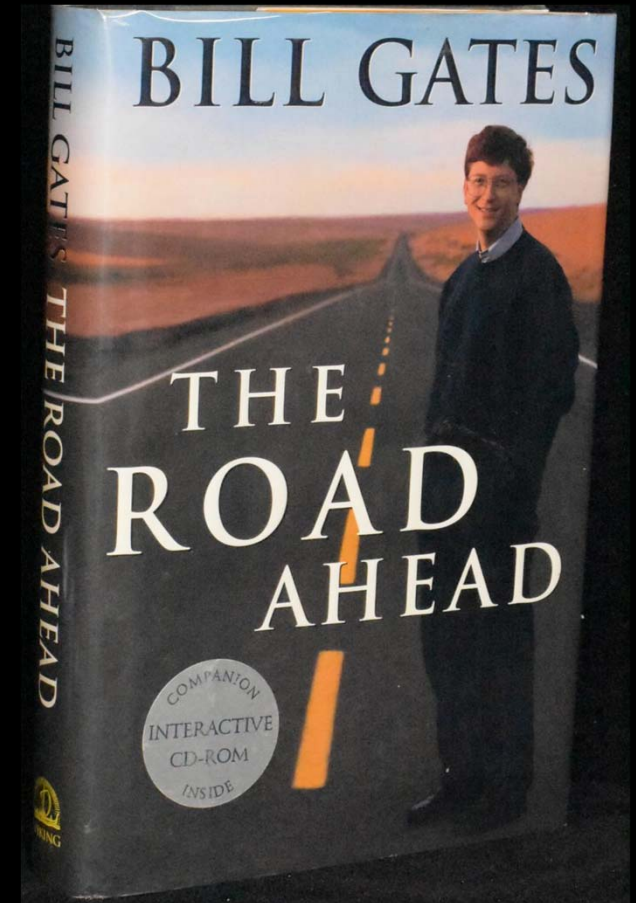
AI in Energy

The Power to Transform our Future

Luis Morencos
Energy Industry Strategist, Microsoft

“Computers will one day
see, hear, talk, and
understand human beings”

Bill Gates in *The Road Ahead*, 1995



Artificial Intelligence

Machine Learning

Deep Learning

Generative AI



Artificial Intelligence

The field of computer science that seeks to create intelligent machines that can replicate or exceed human intelligence



Machine Learning

Subset of AI that enables machines to learn from existing data and improve upon that data to make decisions or predictions



Deep Learning

A machine learning technique in which layers of neural networks are used to process data and make decisions



Generative AI

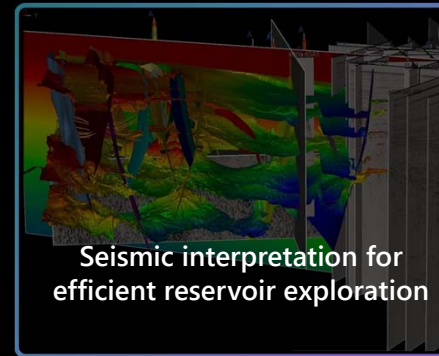
Create new written, visual, and auditory content given prompts or existing data

AI breakthroughs

- 2016 ● **Object recognition**
Human parity
- 2017 ● **Speech recognition**
Human parity
- 2018 ● **Machine reading comprehension**
Human parity
- 2019 ● **Machine translation**
Human parity
- 2020 ● **Conversational QnA**
Human parity
- 2021 ● **Image captioning**
Human parity
- 2021 ● **Question Answering**
Human parity

AI in Energy

The Energy Industry has leveraged AI in uses cases across the value chain





OpenAI

Large pretrained foundation AI models
custom-tunable with your parameters and your data



Content generation



Summarization



Code generation



Semantic search

Azure Open AI Services

GPT-3.5

GPT-4 (preview)

ChatGPT (preview)

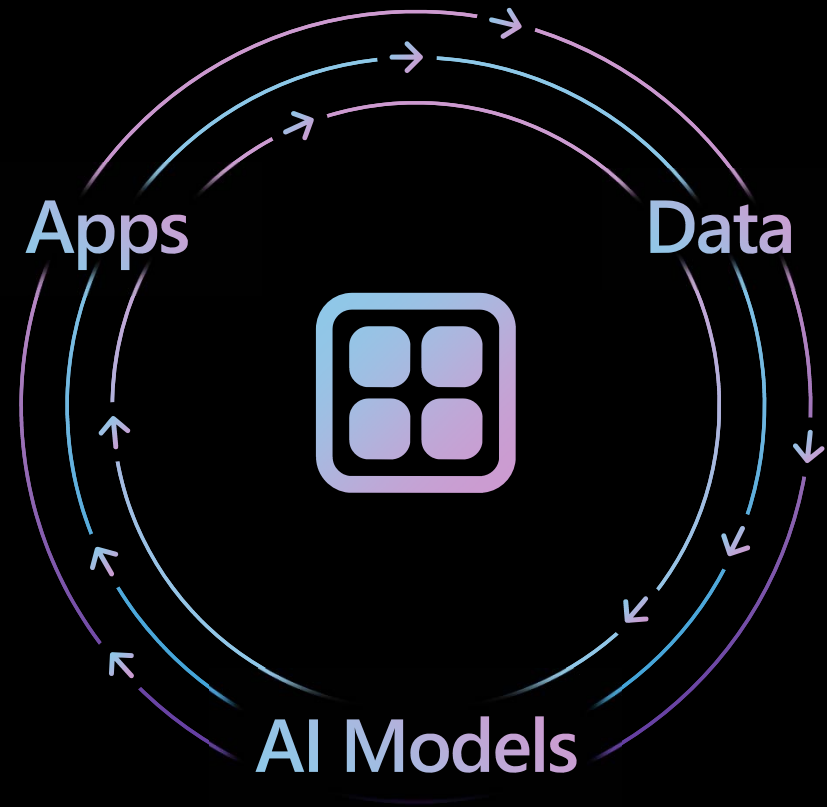
Generative Text Models, with varying capabilities and uses

DALL·E 2

(private preview)

Generative Image Model

In the age of AI,
every app should
be intelligent



Democratization
of AI

Foundation
Models

Foundation Models transform how we think about AI

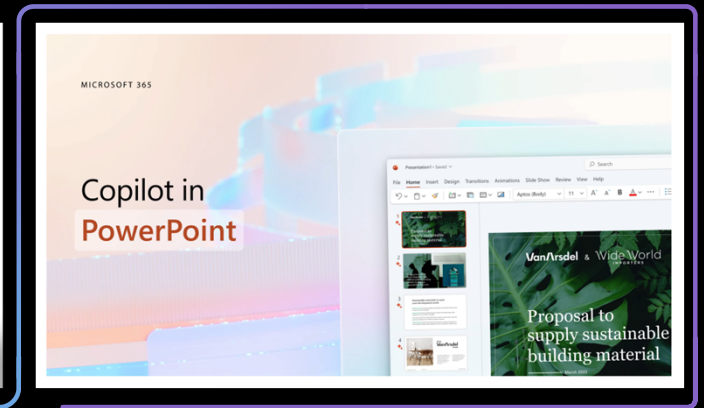
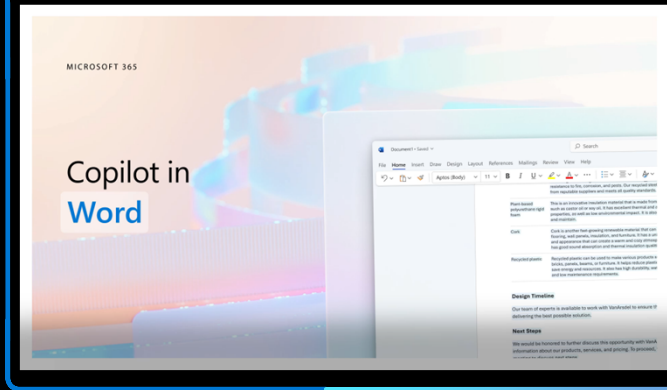
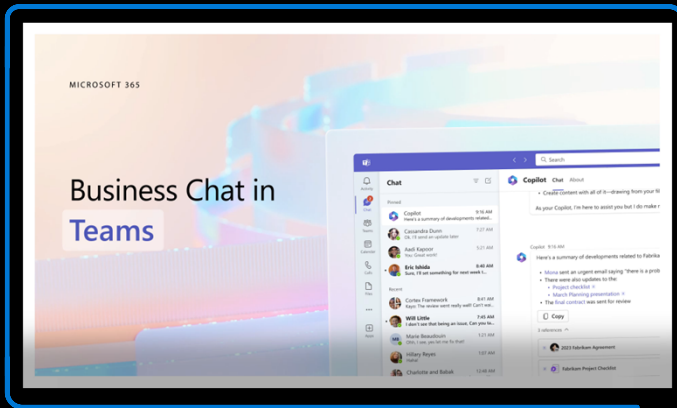
Traditional AI

Simple model:
Purpose-built for one use

Foundation models

Foundation models:
More generalized intelligence
with many applications

Democratization of AI



Azure AI

Applications

Microsoft 365 Microsoft Dynamics 365 Partner Solutions

Application Platform AI Builder

Power BI Power Apps Power Automate Power Virtual Agents

Scenario-Based Services Applied AI Services

Bot Service Cognitive Search Form Recognizer Video Indexer Metrics Advisor Immersive Reader

Customizable AI Models Cognitive Services

Vision Speech Language Decision **Azure OpenAI Service**

ML Platform

Azure Machine Learning



Business Users



Developers & Data Scientists

Copilot



Copilots have a *conversational user interface*

Copilots are powered by *foundation models*

When the capabilities of the Copilot's are insufficient for solving a task, its capabilities can be extended by *skills*

It has a *scope*

Energy Transition

3x annual average of renewable capacity

+60% of all passenger cars sold WW to be electric by 2040

+30% increase share of decentralized renewable energy WW by 2030

4x annual investment in Smart Grids

+\$500 Billion average annual investment in Green H2 and CCUS for Industrial Clusters

Copilot



in Energy



Design, Engineering & Construction



Tender, bidding, permits, contracting, procurement....



Regulation



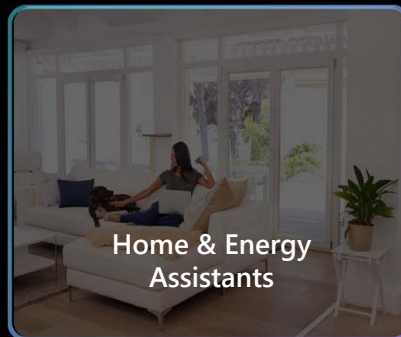
Customer Service & Claim Management



Co-Pilot for Field Engineers



Co-Pilot for Sellers and Traders



Home & Energy Assistants



Co-Pilot for Control Room

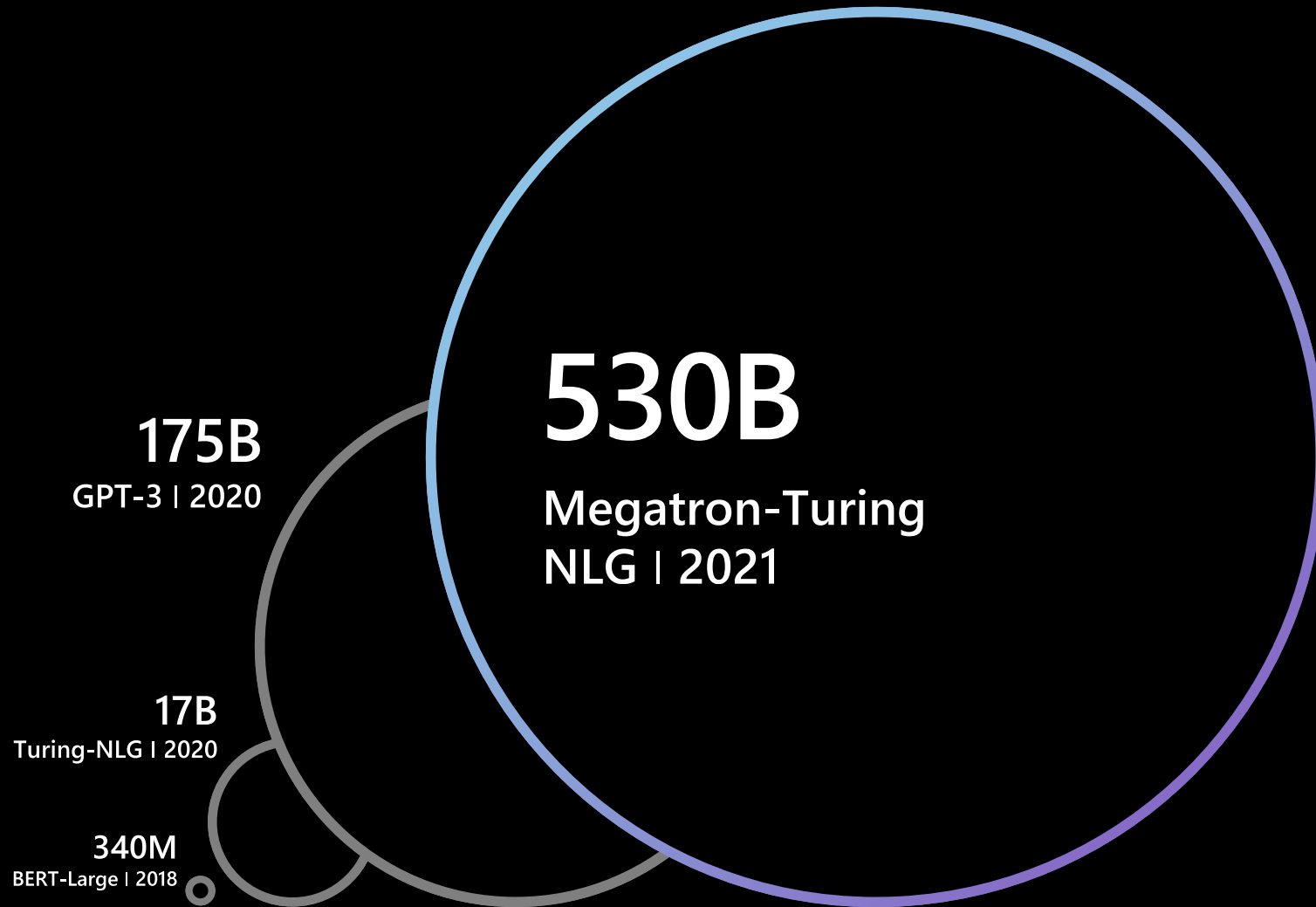


Cybersecurity

175B
GPT-3 | 2020

17B
Turing-NLG | 2020

340M
BERT-Large | 2018



175B
GPT-3 | 2020

17B
Turing-NLG | 2020

340M
BERT-Large | 2018

530B
Megatron-Turing
NLG | 2021

Three paradigms for the future of cloud



Modern Connected Apps

A new paradigm for
connected applications

5G and Space technologies



AI Co-Reasoning

A new paradigm for human
and machine interaction

Foundation Models and Generative AI



Quantum at Scale

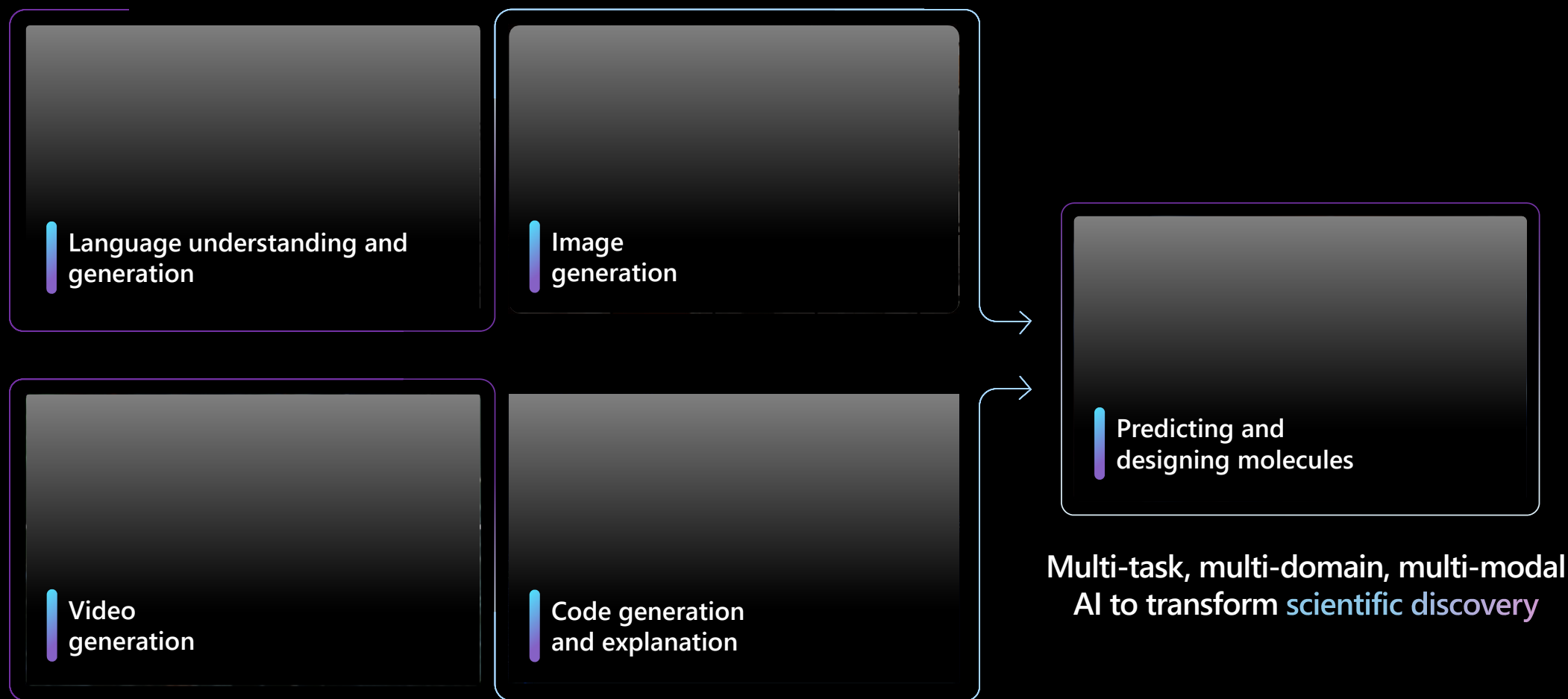
A new paradigm for
computing

HPC, AI and Quantum


Security

Co-innovation

Models are evolving from understanding the language of humans to understanding the language of nature



Accelerate the next 250 years of science into the next 25 years
to help to solve some of our most challenging problems like
Climate Change



... new materials - chemical design - sustainable energy technologies - unit commitment problem ...

Johnson Matthey: Driving new discoveries in sustainable energy

- **Challenge:** Discoveries needed to create a zero-carbon future will require significant breakthroughs in chemical and materials science
- **Solution:** New predictive modeling tools accelerate simulations with supercomputing capabilities of Azure HPC and refined workflows
- **Benefits:** Acceleration of certain quantum chemistry calculations, reducing the turnaround time for scaled workloads from six months to a week

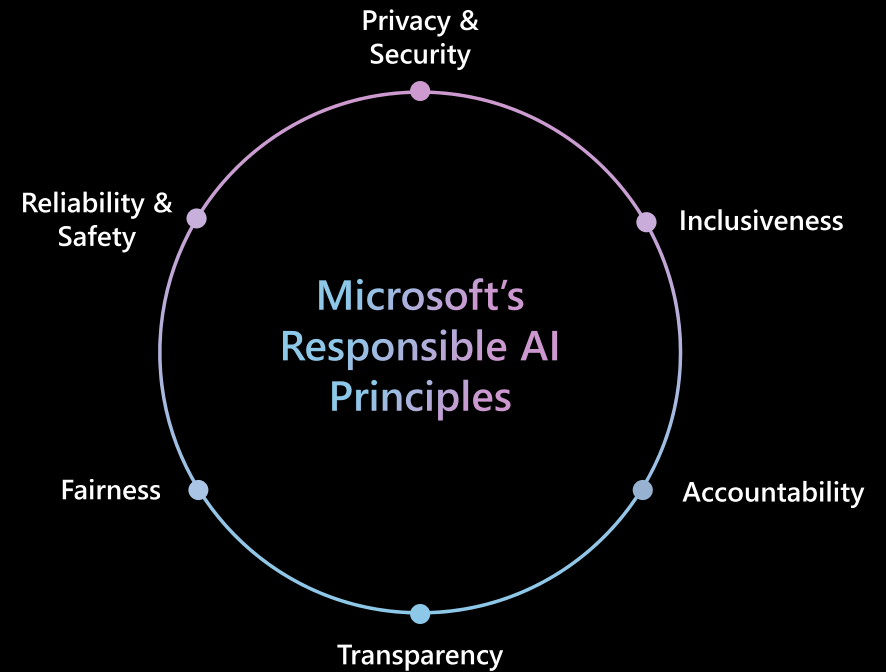


Ethical dilemmas from AI

Responsible AI

Regulation

Impact of AI on
future of work



Thank You