BCNET CONNECT

HIGHER ED & RESEARCH TECH SUMMIT

SOUL on Top of the World

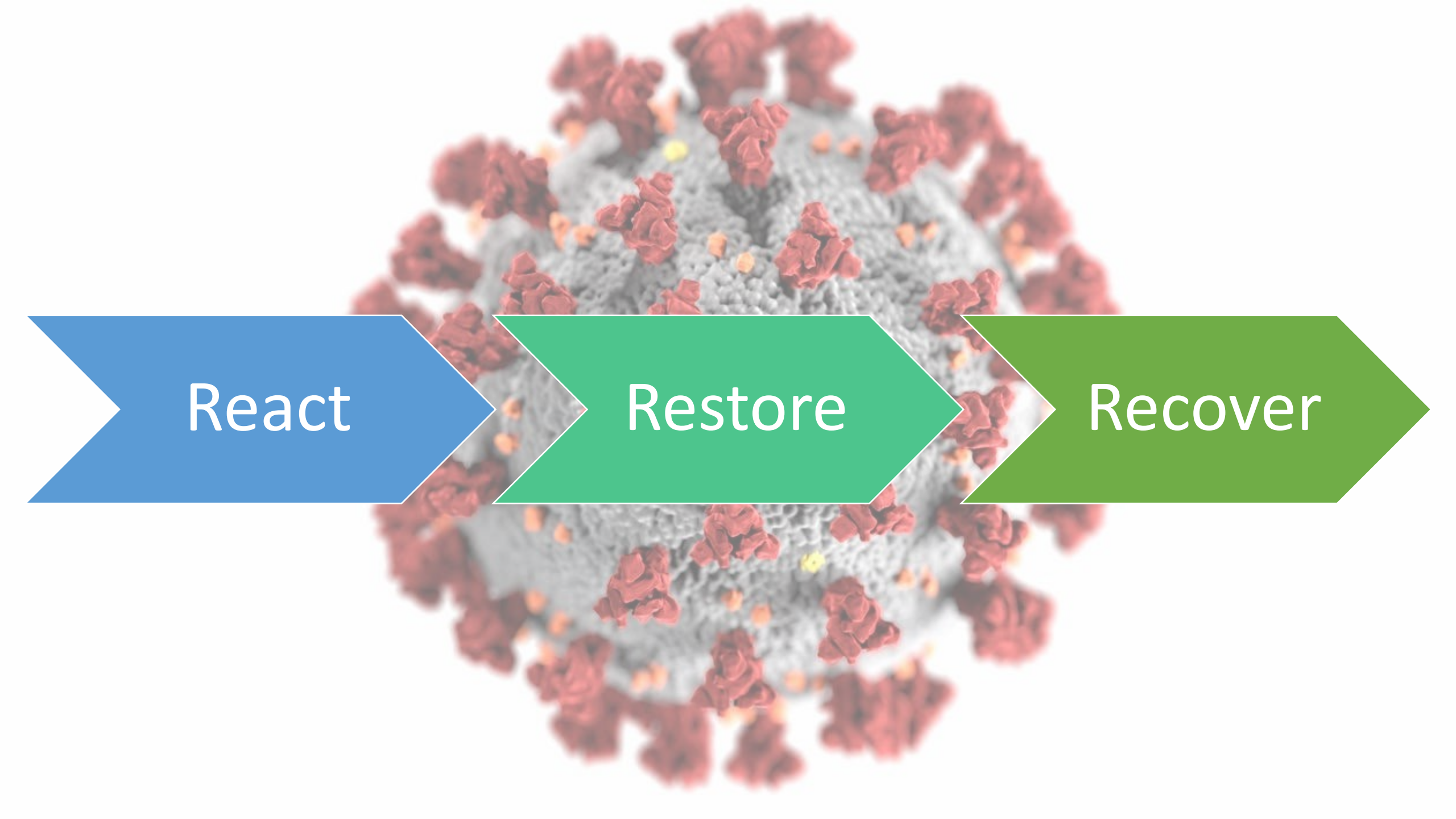
Canada
Innovation Nation

John Weigelt
Chief Technology Officer
Microsoft Canada

BCNET CONNECT

Canada at 175

Deloitte's Canada at 175 program is a multi-year research initiative designed to spark vital discussion among Canada's governments, businesses, and citizens about Canada's future.


React
Restore
Recover

Canada Becomes Relatively More Innovative

Country + Provincial Rankings | Country-only Rankings

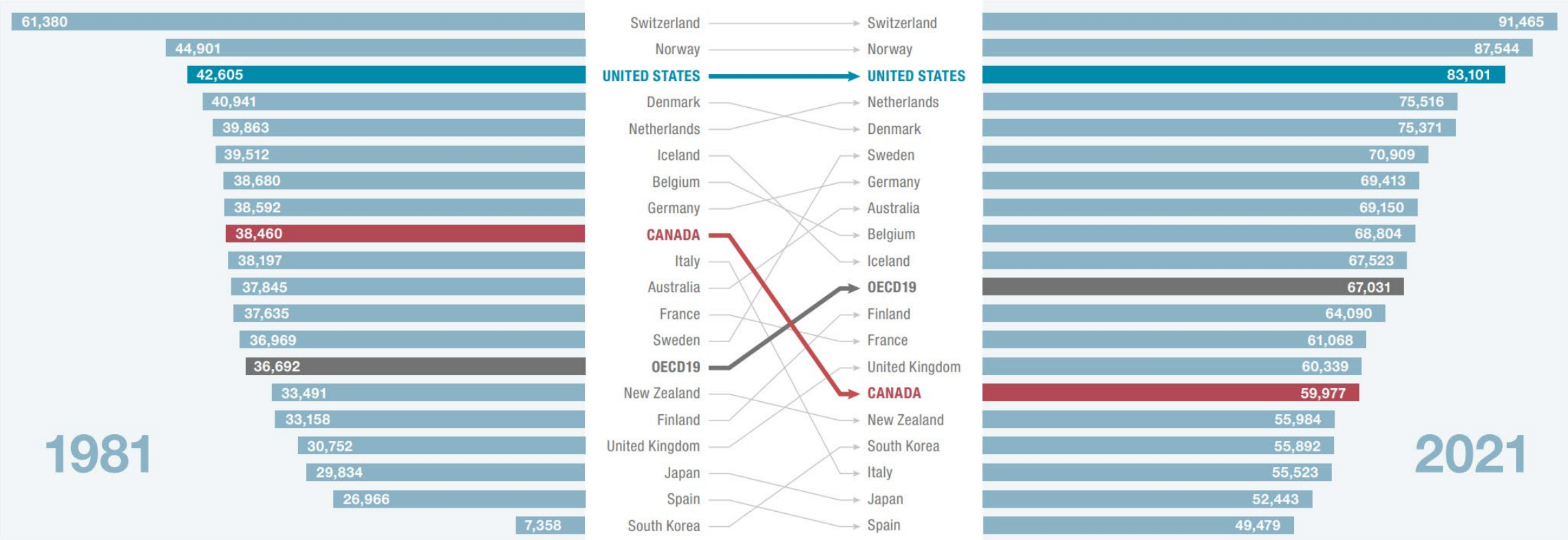
1	Switzerland	A	5	Austria	B	9	Netherlands	C	13	Ireland	D
2	United States	A	6	Finland	B	10	Japan	C	14	Australia	D
3	Sweden	A	7	Germany	C	11	**Canada**	C	15	France	D
4	Denmark	B	8	Norway	C	12	Belguim	C	16	United Kingdom	D

Source: The Conference Board of Canada.

CHART 2

STANDARD OF LIVING IN 1981 AND 2021

In 2019 Canadian dollars per capita at purchasing power parity



Pressures

- **Aging workforce / Retirements**
- **Poor productivity growth**
- **Low Innovation Investments**
- **Environmental Sustainability**

Additional Pressures

- **Industry refactoring**
  - **Retail, Hospitality, Entertainment, Services, ….**
- **Industry Echoes**
  - **Construction, Commercial Real Estate, Transportation, Supplychain, Manufacturing**
- **New Patterns of Work**
- **Post Lockdown Churn / Skills Shortage**
- **International Conflict**
- **Autarky**
  - **Increasing localization**

Growing Opportunity

- Leadership
- Technology
- Cybersecurity
- Research
- Industry


Innovation


PITTSBURGH

Canada’s Supercluster Initiative: $2B investment to build industries of tomorrow

The Innovation Supercluster Initiative is the cornerstone of Canada’s federal government innovation agenda- build collaborative partnerships, grow innovation and create new jobs.

- ❑ This program includes large anchor firms to start ups, from post-secondary research institutions to research and government partners.
- ❑ The development of supercluster will support the health of the Canadian economy by:
  - advancing Canadian technological capabilities and advance business-led
  - helping companies succeed in the global marketplace with new products, processes and services;
  - building a competitive advantage for their supercluster by positioning as a world-leading innovation hotbed that attracts cutting-edge research investment and talent.

DIGITAL TECHNOLOGY

British Columbia

Boost competitiveness in precision health, manufacturing and resource and environment technologies by advancing data collection, analysis and visualization.

PROTEIN INNOVATION COUNCIL

Alberta- Saskatchewan- Manitoba

Harness technologies to help Canada become the world leader in supplying plant-based proteins and related products.

ADVANCED MANUFACTURING

Southern Ontario

Drive collaboration between the tech & manufacturing sectors using technologies like Big Data, AI and the "internet of things" to scale production & improve efficiency

OCEAN

Atlantic

Maximize the potential and sustainable development of the ocean economy by investing in digital technologies for industries such fisheries, offshore oil and clean energy.

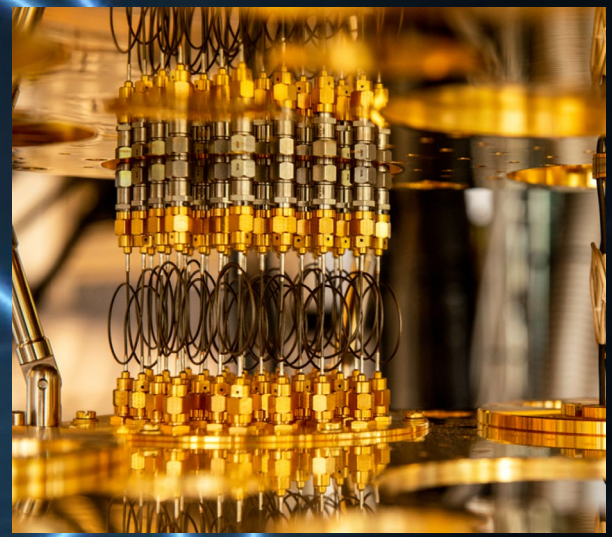
SCALE.AI

Quebec

Focus on defining a global supply chain platform leveraging artificial intelligence and data science particularly in retail, manufacturing and infrastructure services.


CANADA


MakerBot Replicator 2




SOCIAL
MEDIA
CONNECT
click
People
Friends
Share
cloud
CHECK LIST:
Tweet
hello!
good!

Social

Advanced Connectivity

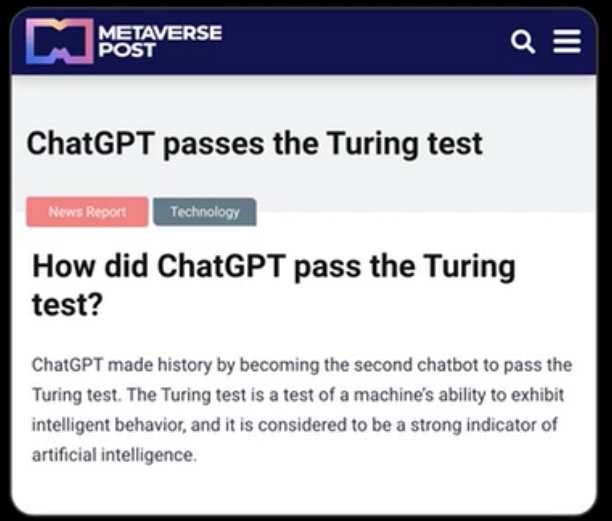
Data

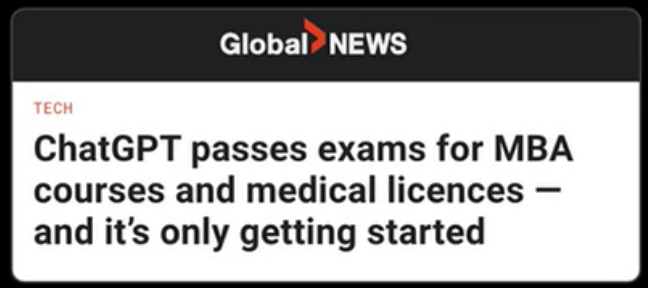
Innovations Transforming Data Handling

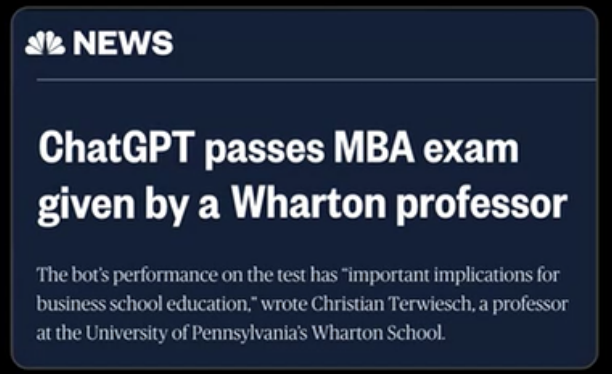
- Datasheets for Datasets
- Differential Privacy & other Deidentification techniques
- Synthetic data generation
- Confidential computing
- Data watermarking
- Big data, Little data
- Federated Learning
- Data Meshes

Artificial Intelligence

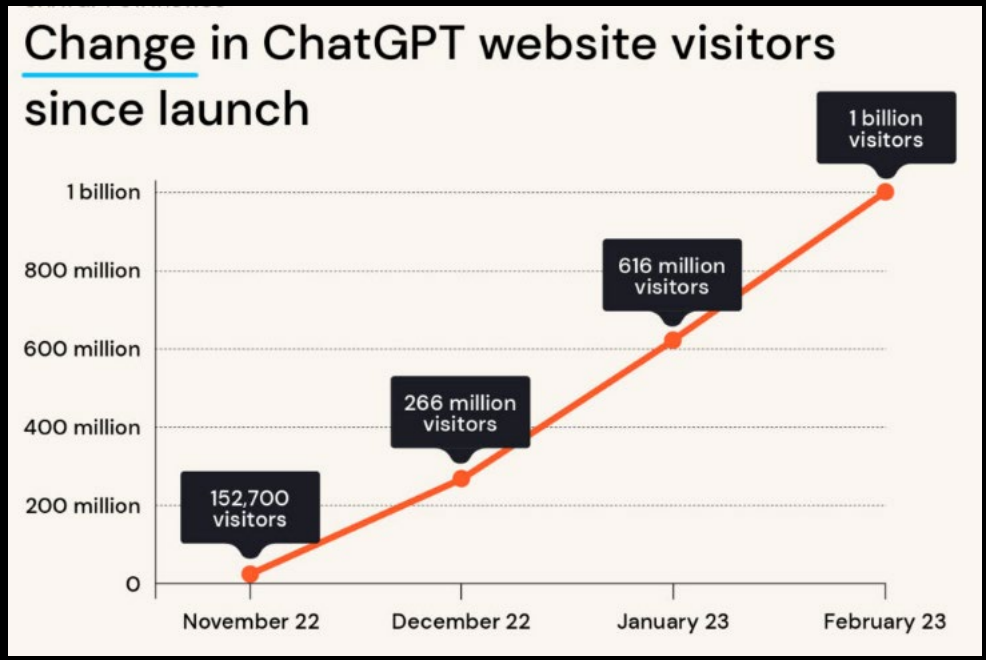
The AI technology is here

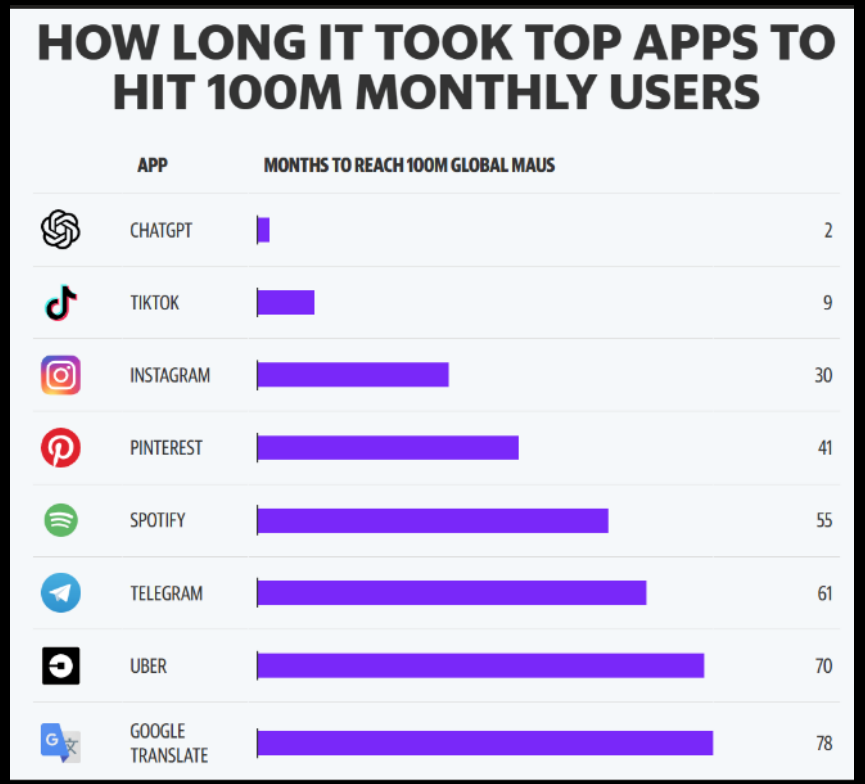


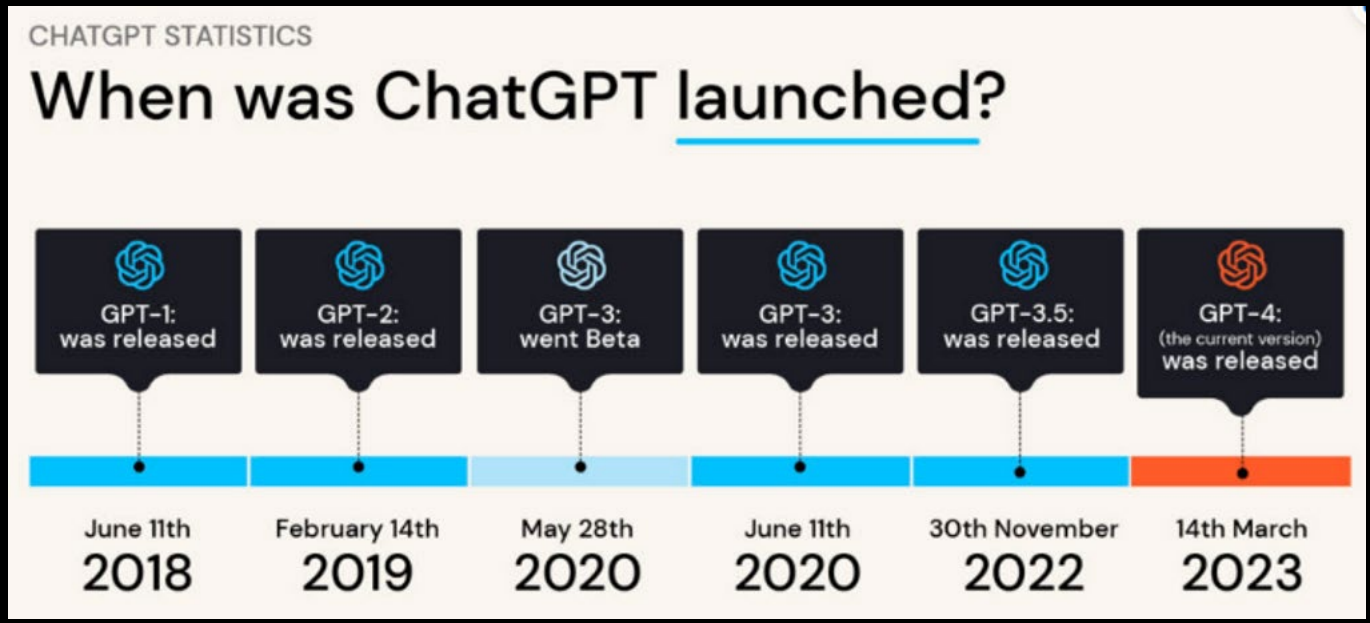




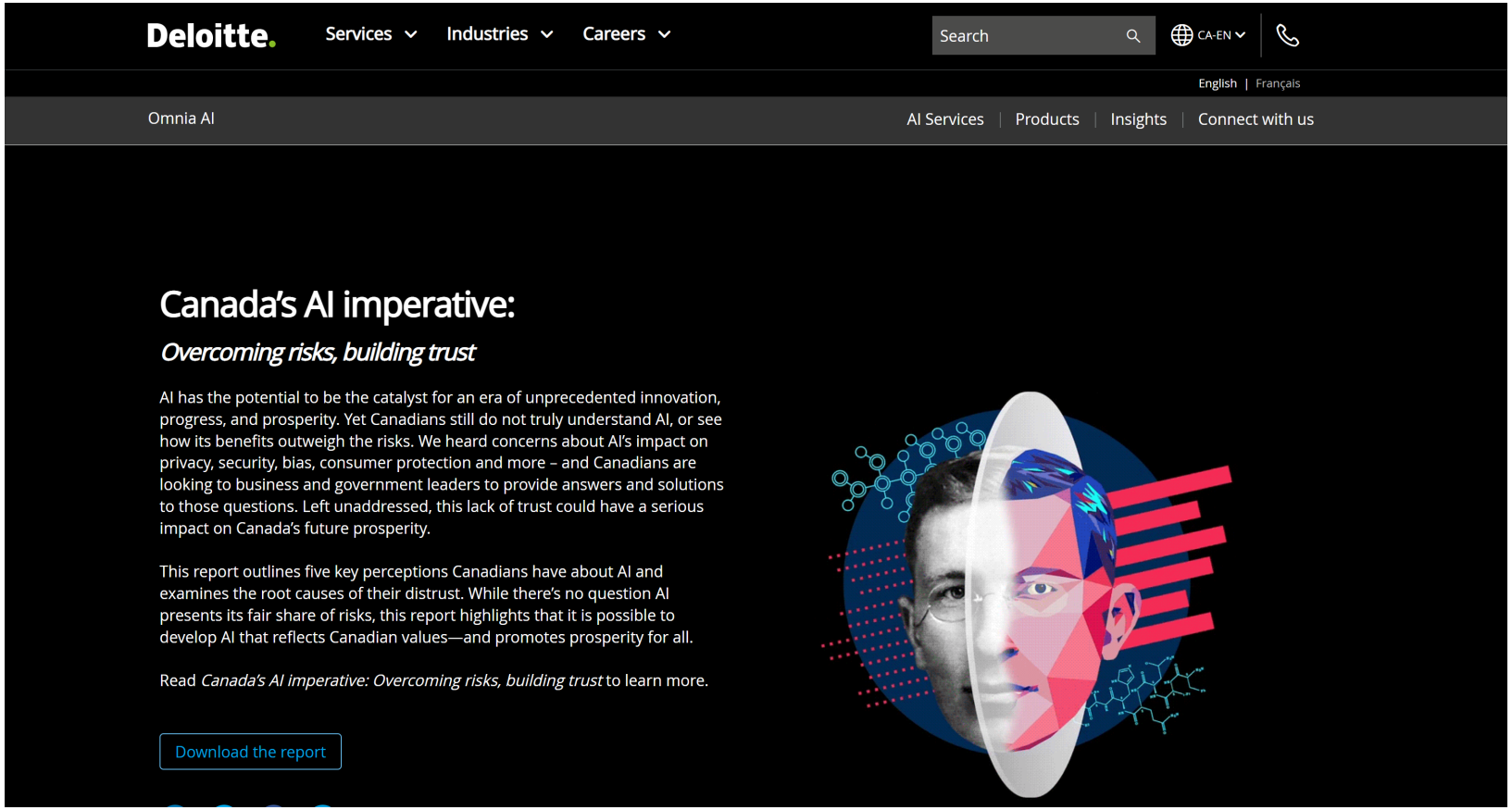
chatGPT Speed of Adoption is unprecedented

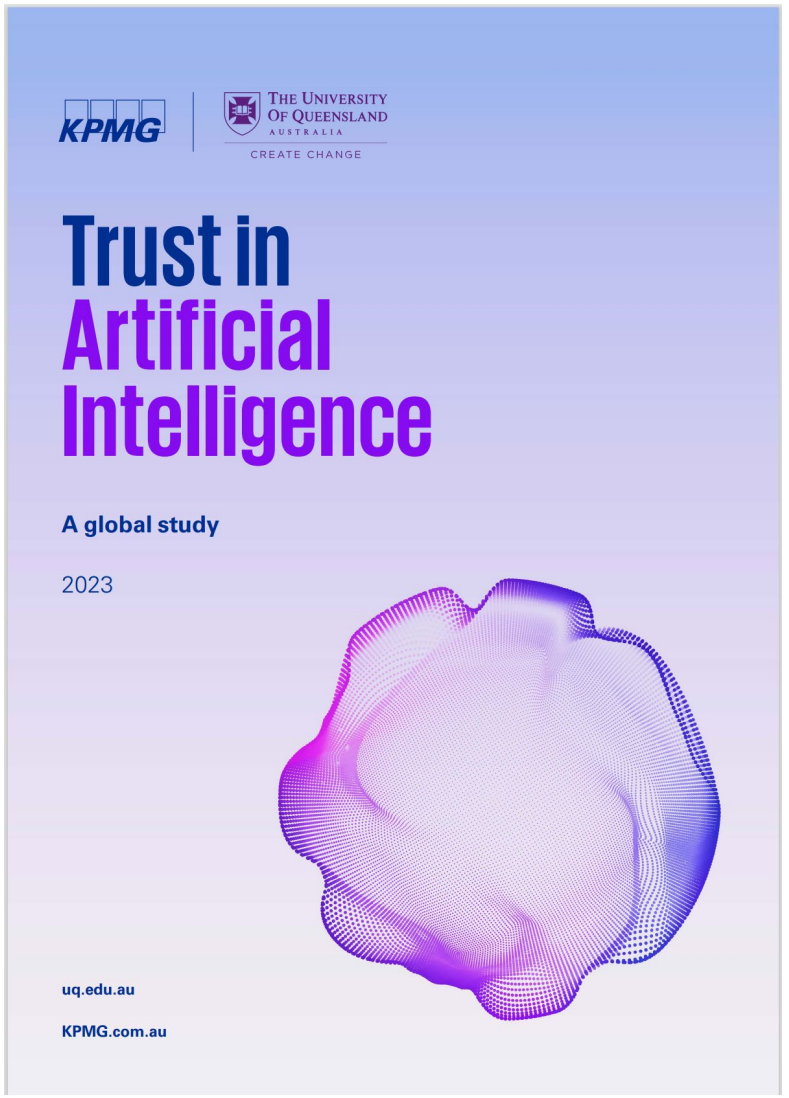






Canada Lags in Trust in AI





Getting Specific on AI

Data	Math	Codifying	APIs	Packages	…	Application	Function	Business

Data
- Context of collection
- Unrecognized Bias
- Synthetic data
- Temporal characteristics
- Streaming / static

Training
- Supervised
- Semi-supervised
- Unsupervised

Models
- Locked
- Trained
- Evolving

Automation
- Human in the loop
- Human over the loop
- Human out of the loop

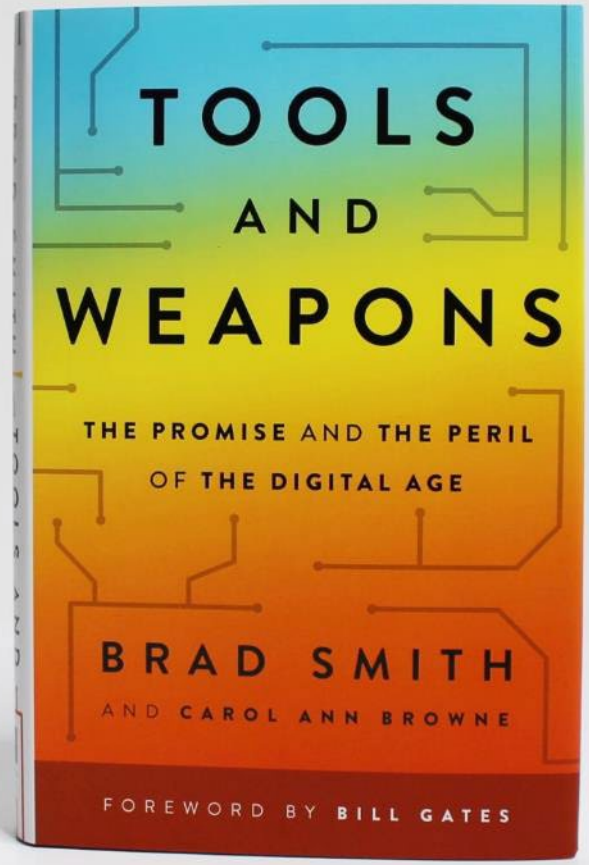
Security/privacy
- Model Theft
- Model Corruption
- Faulty training (synthetic data)
- Adversarial perturbation

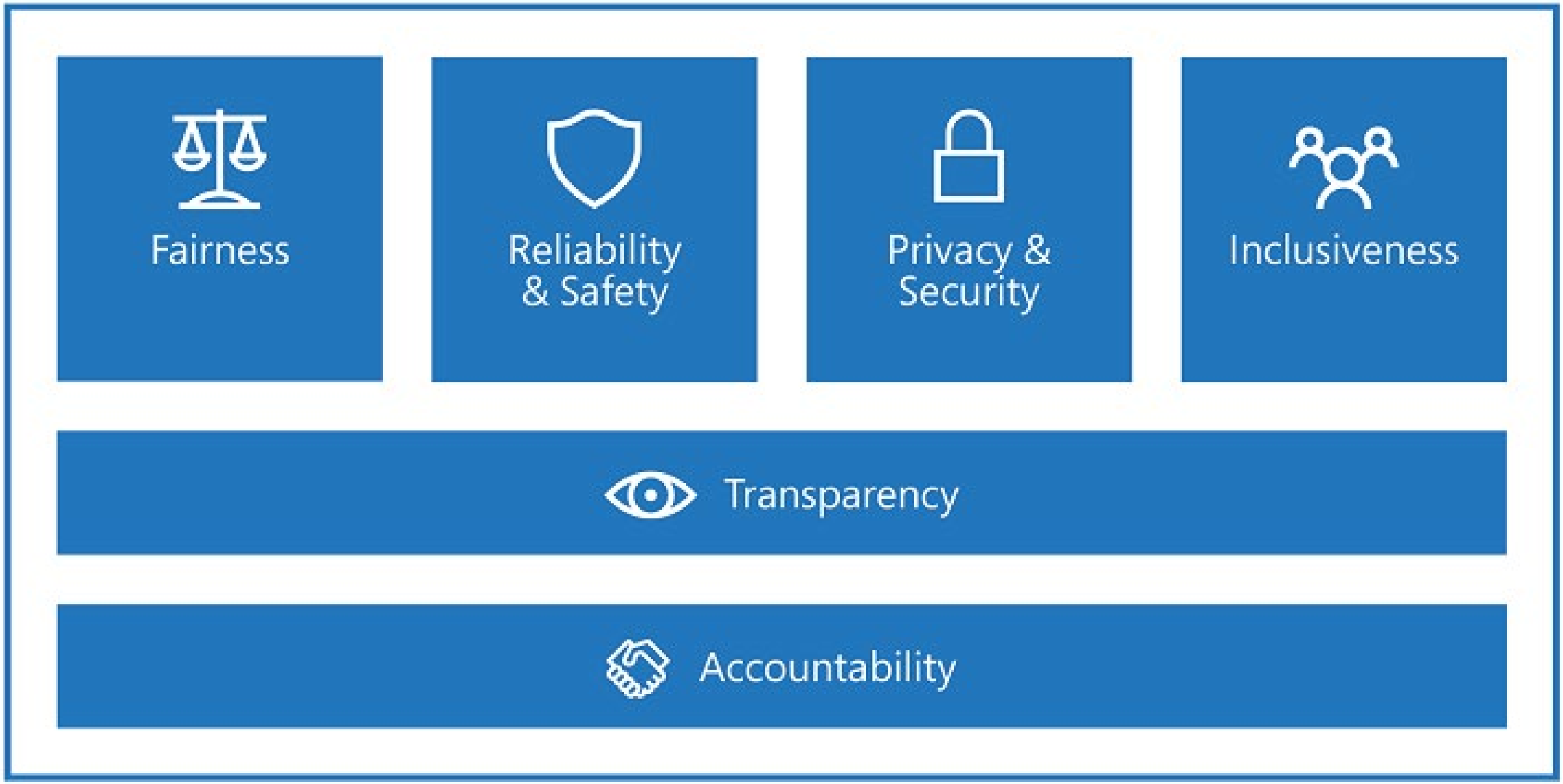
Types
- Responsive
- Generative
- LLM
- Predictive

Why responsible AI?

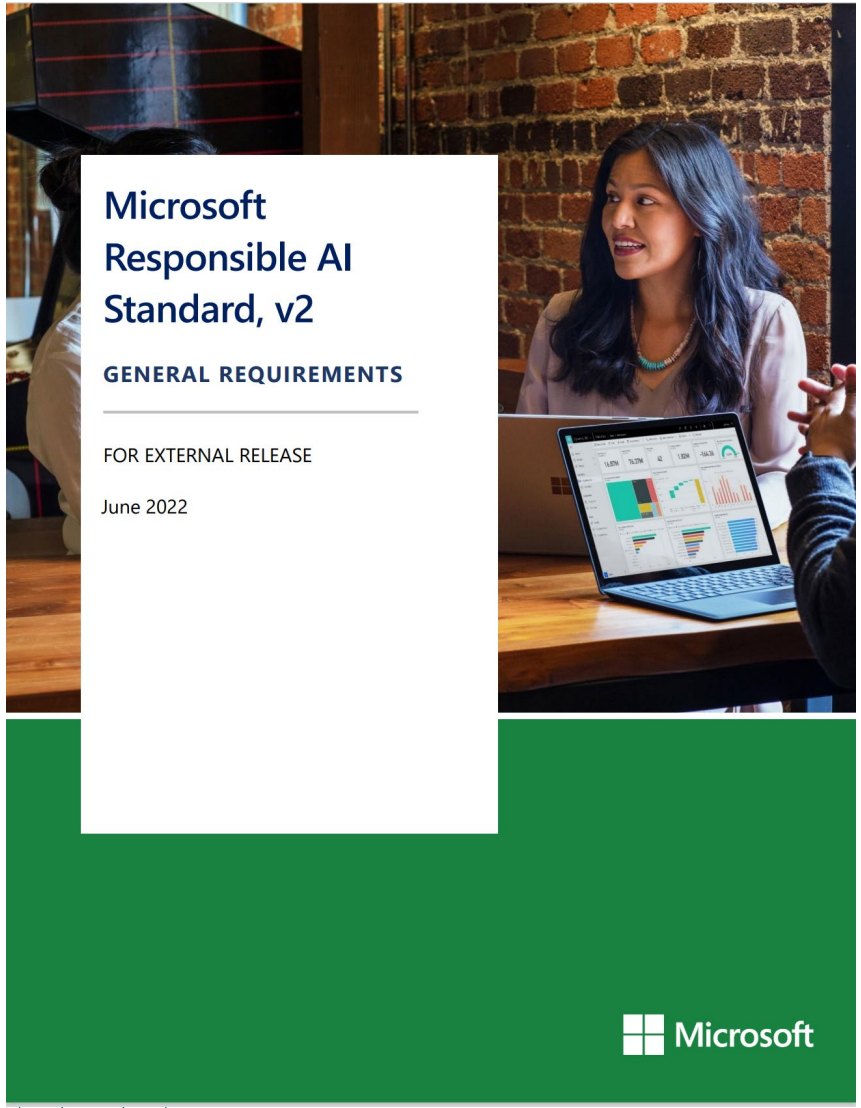
"The more powerful the tool, the greater the benefit or damage it can cause…Technology innovation is not going to slow down. The work to manage it needs to speed up."

Brad Smith
President and Chief Legal Officer, Microsoft




Fairness
Reliability & Safety
Privacy & Security
Inclusiveness
Transparency
Accountability

Responsible AI Standard and Impact Assessment



[Microsoft-Responsible-AI-Standard-v2-General-Requirements-3.pdf]

[Microsoft-RAI-Impact-Assessment-Template.pdf]

Filter by title

General Data Protection Regulation (GDPR)
Azure Software Licensing Terms
Microsoft Developer Agreement
Terms of Use
Learn TV Code of Conduct
Terms of Learn Data Sharing

Use cases for Azure OpenAI Service

Article • 01/31/2023 • 20 minutes to read • 3 contributors

Feedback

What is a Transparency Note?

An AI system includes not only the technology, but also the people who will use it, the people who will be affected by it, and the environment in which it is deployed. Creating a system that is fit for its intended purpose requires an understanding of how the technology works, what its capabilities and limitations are, and how to achieve the best performance. Microsoft's Transparency Notes are intended to help you understand how our AI technology works, the choices system owners can make that influence system performance and behavior, and the importance of thinking about the whole system, including the technology, the people, and the environment. You can use Transparency Notes when developing or deploying your own system, or share them with the people who will use or be affected by your system.

Microsoft's Transparency Notes are part of a broader effort at Microsoft to put our AI Principles into practice. To find out more, see the Microsoft's AI principles.

The basics of Azure OpenAI

Introduction

Azure OpenAI provides customers with a fully managed AI service that lets developers and data scientists apply OpenAI's powerful language models including their GPT-3 and Codex series. GPT-3 models analyze and generate natural language, while Codex models analyze and generate code and plain text code commentary. These models use an autoregressive architecture meaning they use data from prior observations to predict the most probable next word. This process is then repeated by appending the newly generated content to the original text to produce the complete generated response. Because the response is conditioned on the input text, these models can be applied to a variety of tasks simply by changing the input text.

CIOSC 101:2019 (D7)

Automated decision systems using machine learning: Ethics by design and ethical use

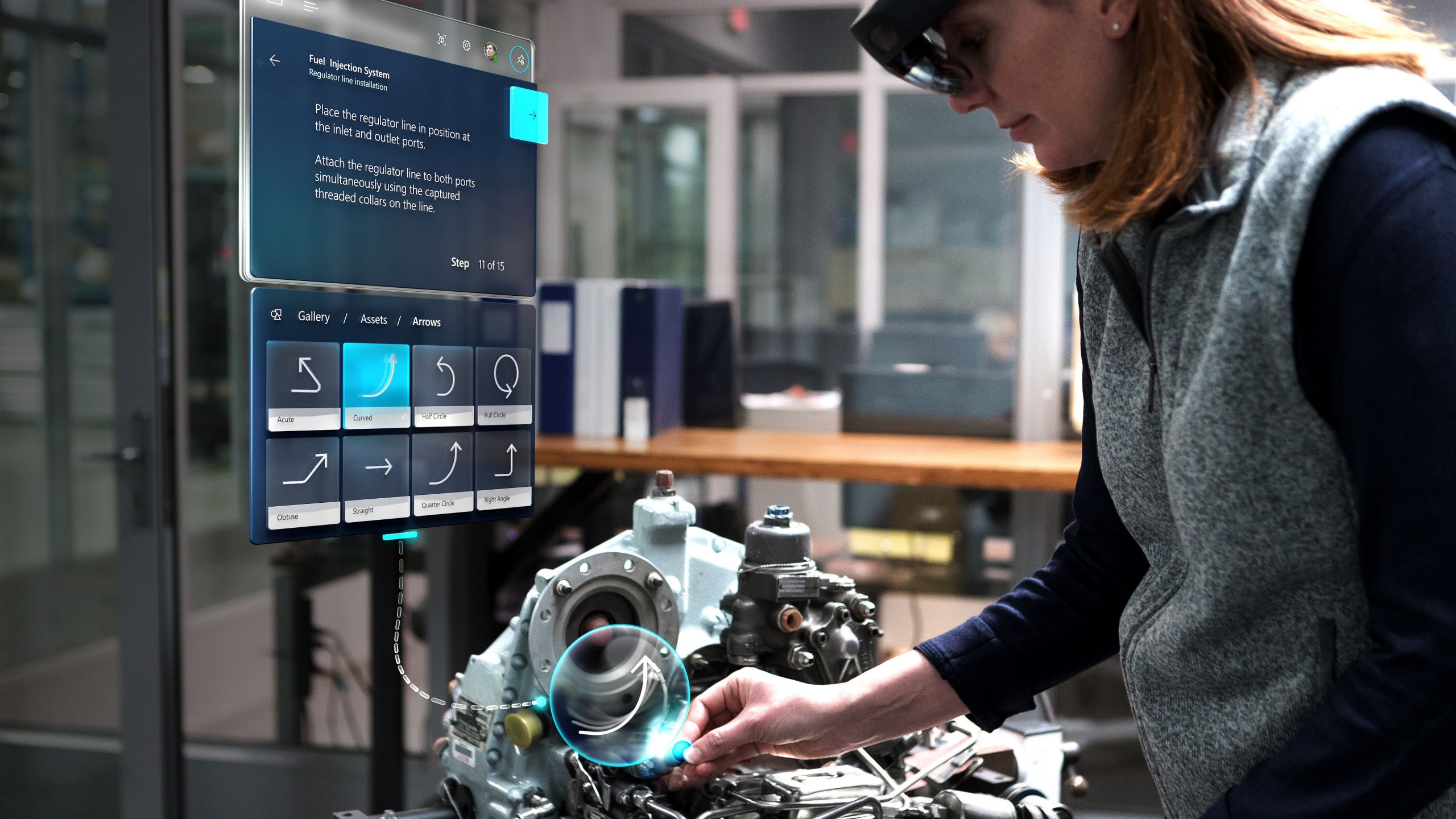
35.020

WARNING

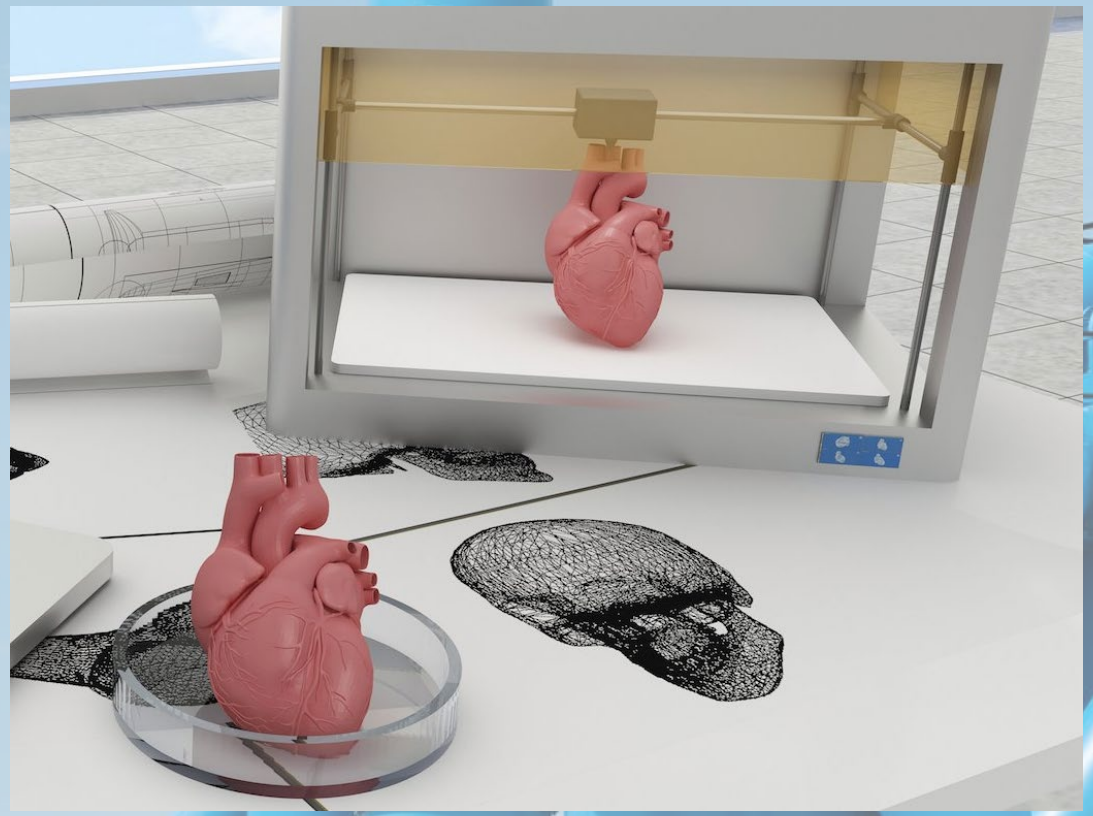
This document is not an official CIOSC Standard. It is distributed for review and comment. It is subject to change without notice and may not be referred to as a National Standard.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

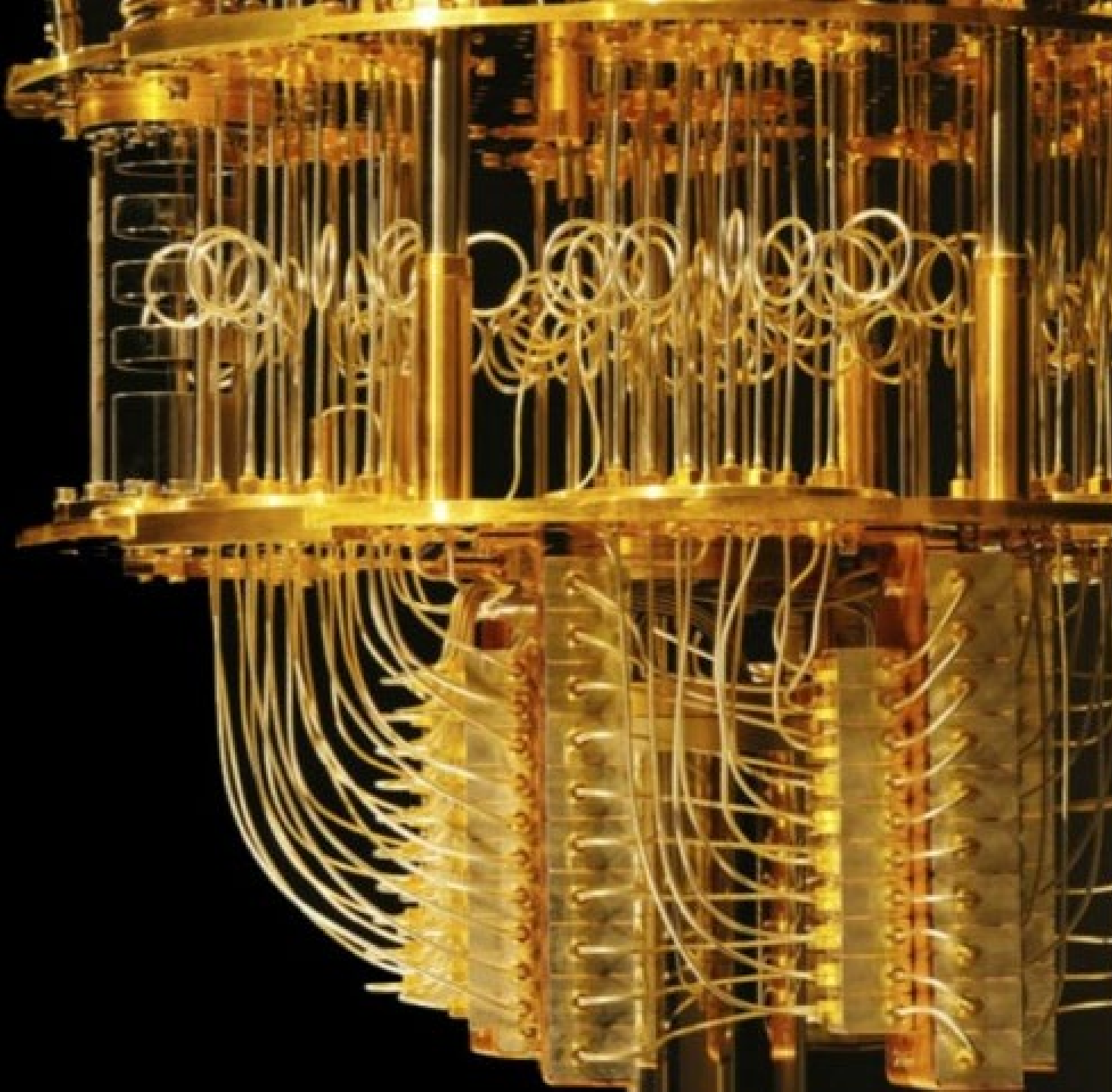
CIO STRATEGY COUNCIL


Fuel Injection System
Regulator line installation
Place the regulator line in position at the inlet and outlet ports.
Attach the regulator line to both ports simultaneously using the captured threaded collars on the line.
Step 11 of 15
Gallery / Assets / Arrows
Acute
Curved
Half Circle
Full Circle
Obtuse
Straight
Quarter Circle
Right Angle

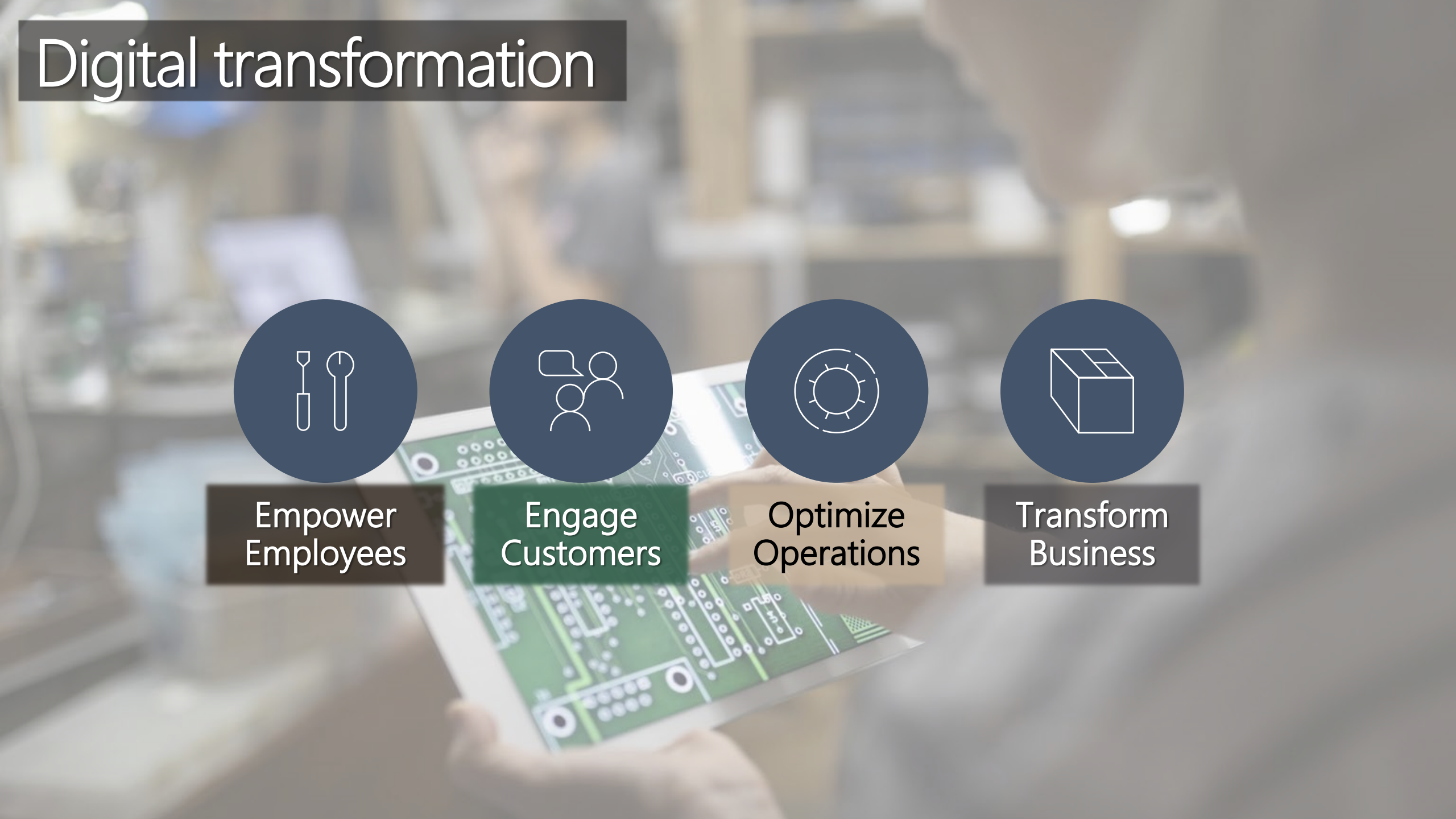
Additive Manufacturing



Quantum



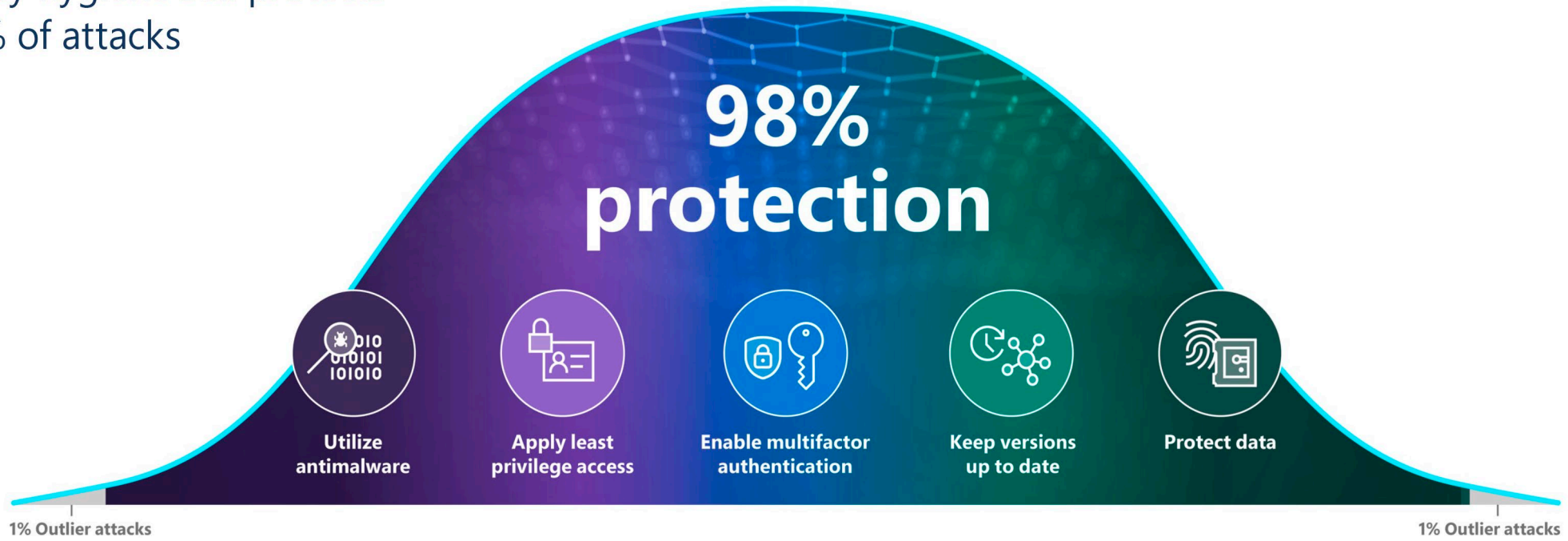
Digital transformation




Security

The cybersecurity bell curve:

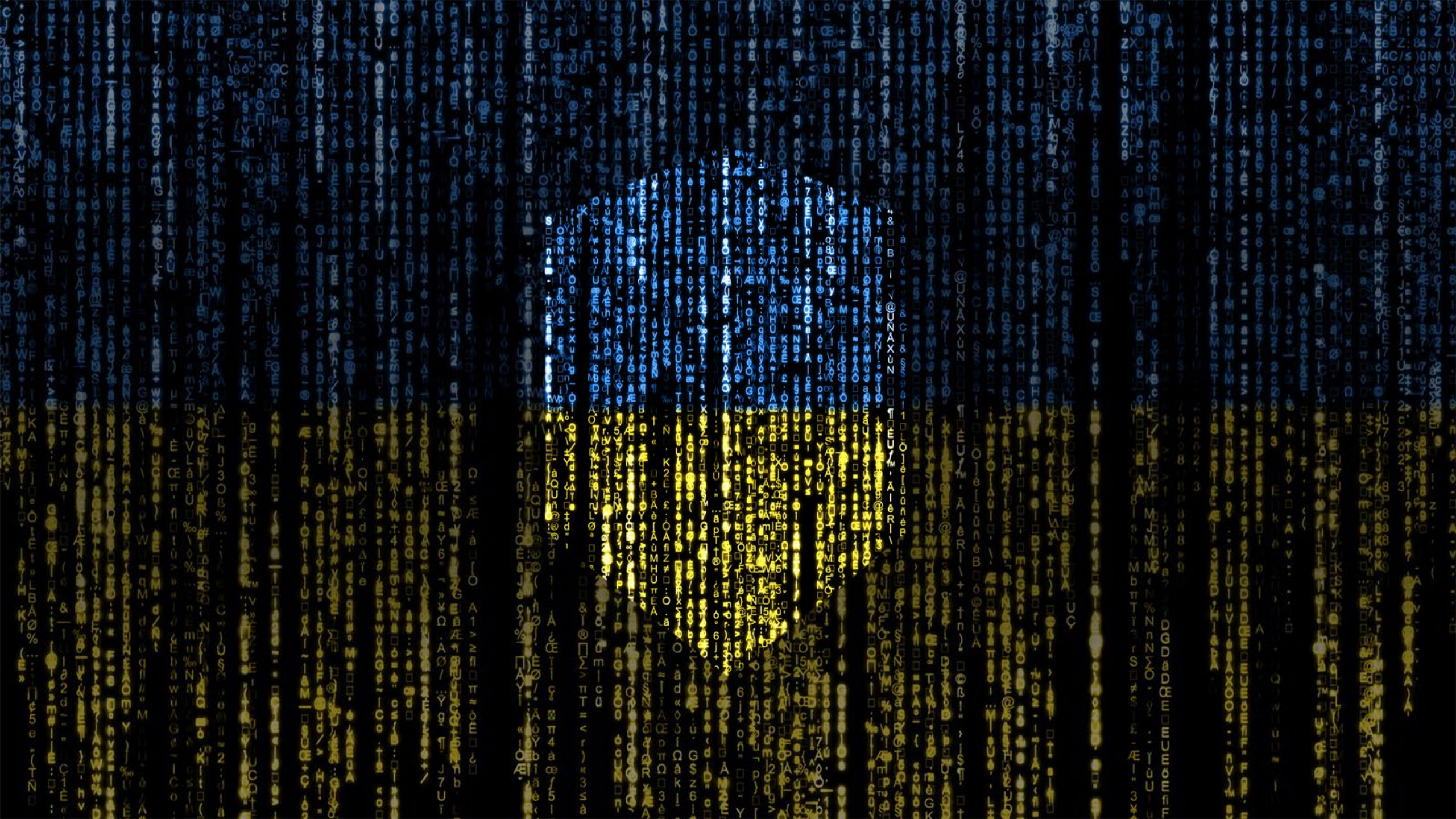
Basic security hygiene still protects against 98% of attacks



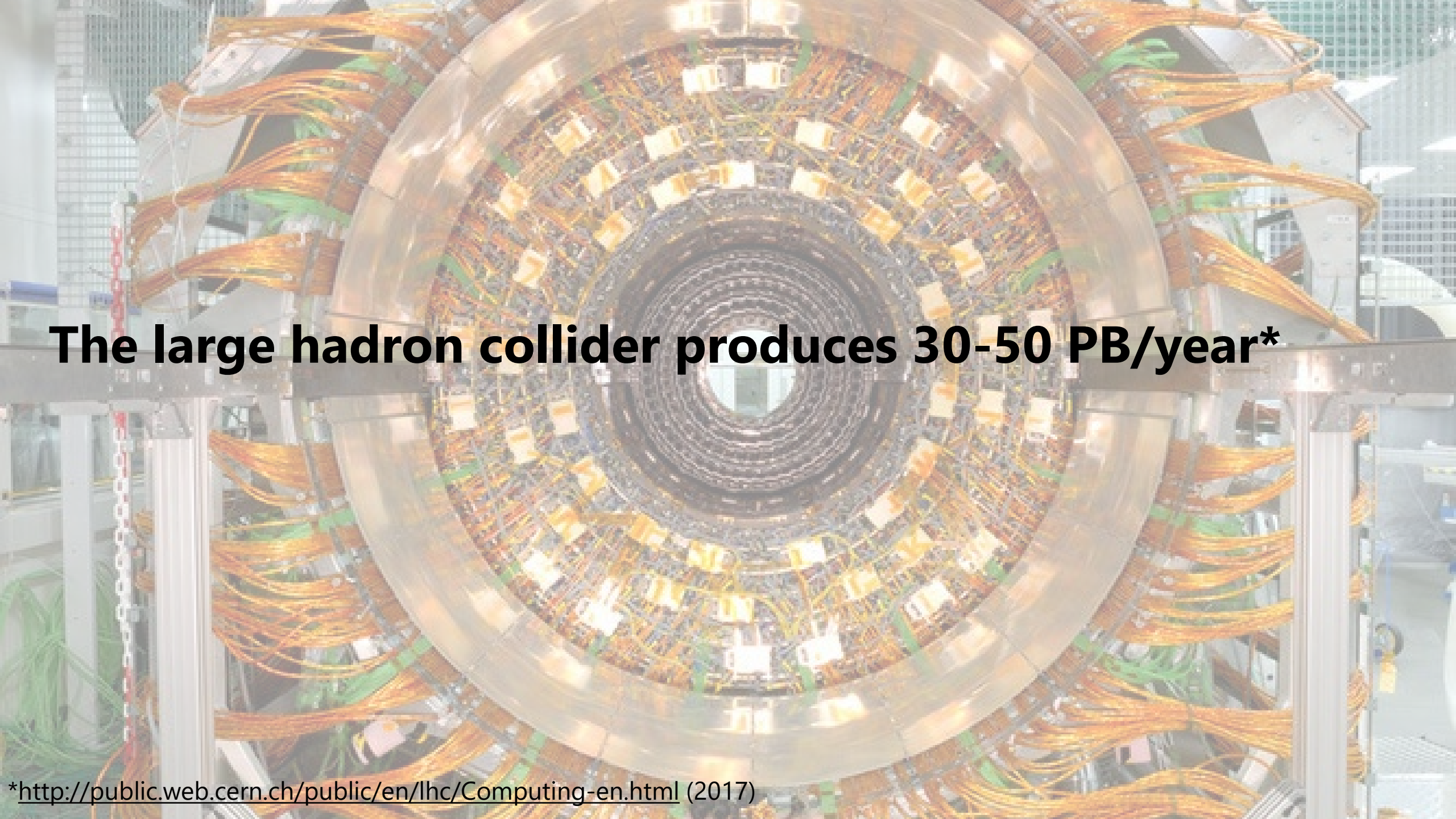
REVIEW POLICY
Review your cyber security policies and execute the basics based on the Zero Trust Framework

INCREASE SKILLS
We're committed to skill 250K student and professionals by 2025 aka.ms/cyberskills

ASK FOR HELP
Ask for help Public Sector Center of Expertise



Cooperation



The large hadron collider produces 30-50 PB/year*

*http://public.web.cern.ch/public/en/lhc/Computing-en.html (2017)

The Square Kilometer Array Observatory

- 16 terabits of data per second to central signal processors
- Store 710 petabytes of data per year,
- Two ‘Science Data Processor’ HPC systems expected to total at least 250 petaflops

SKA Observatory (SKAO): A guide to the soon-to-be largest radio telescope in the world | Space

OPEN AI GPT-3.5

- Trained with over 175B parameters
- The supercomputer developed for OpenAI is a single system with more than 285,000 CPU cores, 10,000 GPUs and 400 gigabits per second of network connectivity for each GPU server.
- Compared with other machines listed on the TOP500 supercomputers in the world, it ranks in the top five

Microsoft announces new supercomputer, lays out vision for future AI work - Source

Digital Research Alliance of Canada

- 271,000 CPU cores
- 10 petabytes of storage
- Jobs restricted to below 7 days

- Among its G7 peers Canada is last when one considers aggregate total compute power in Top500. Looking into compute power relative to gross domestic product (TFlops/GDP) Canada is second last within G7.

Skills

Era of Copilots

AI as a real-time collaborator

…that generates content

…that sparks creativity

…that automates cognitive tasks

…that completes work

Productivity

Culture

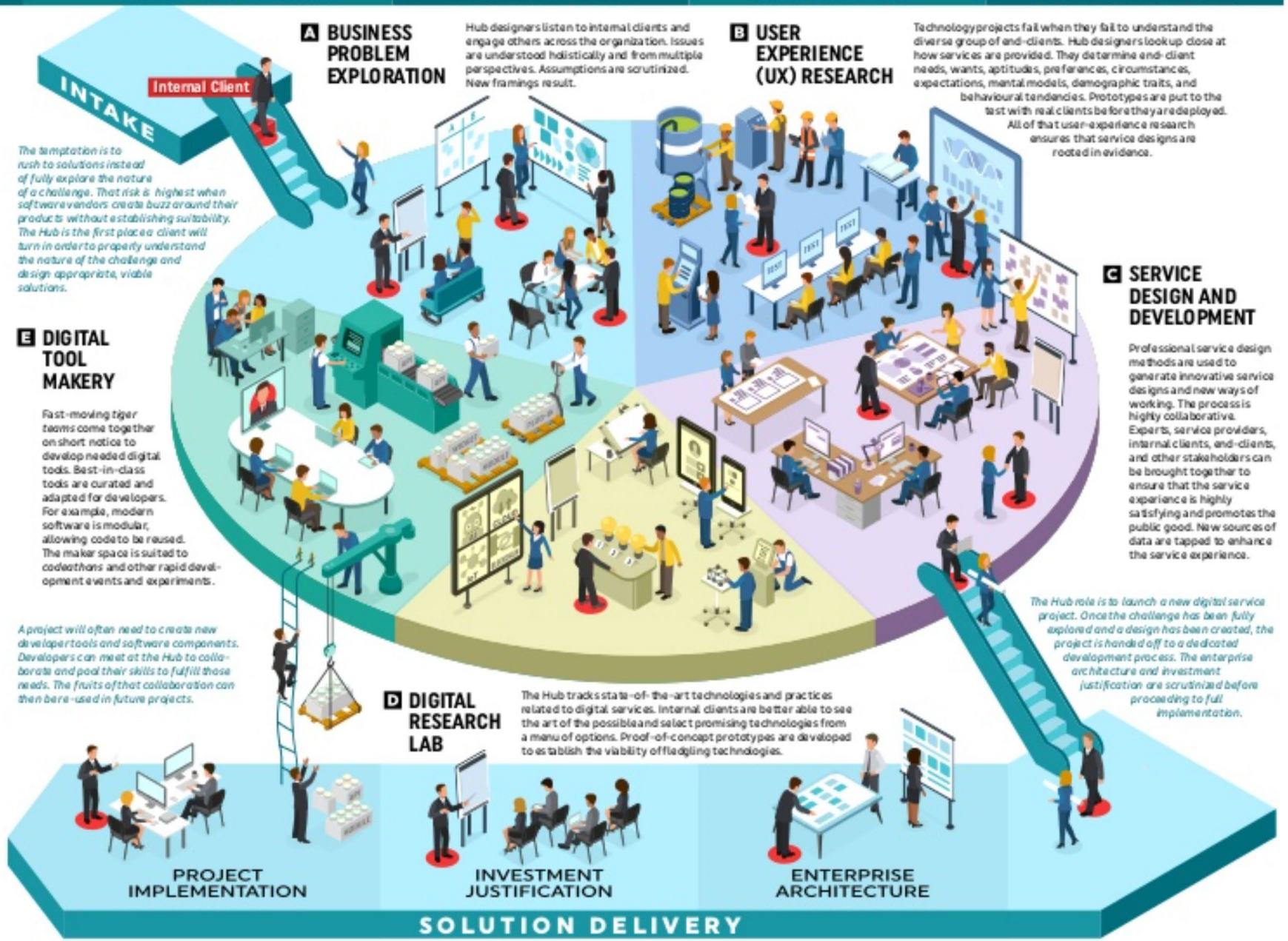
TRANSPORT CANADA

THE HUB

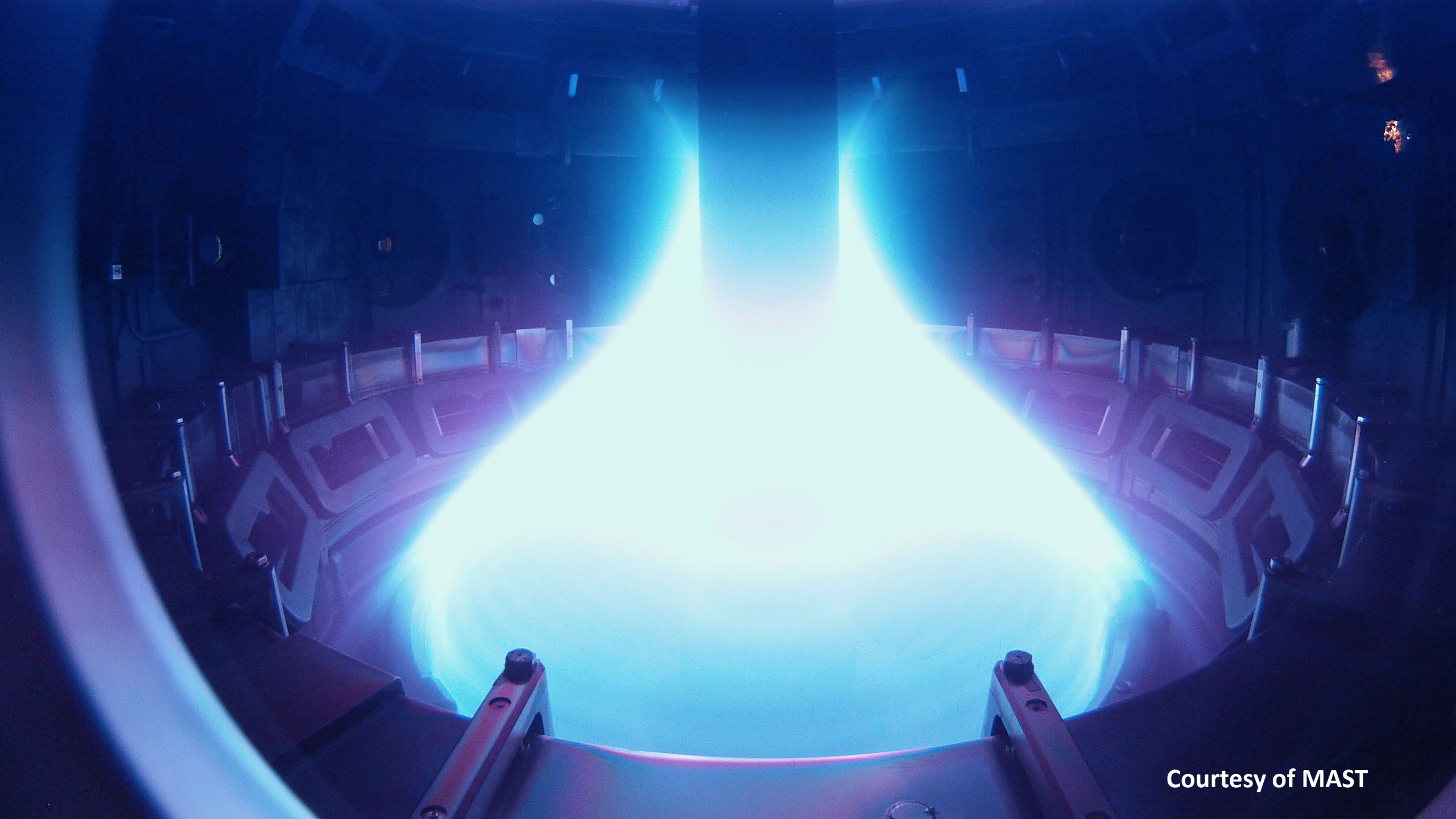
The discipline of ***digital service design*** is making great strides in centring public services around the diverse needs of clients. Citizens have high expectations about the quality of services they receive. That applies equally to regulatory oversight because inspectors are expected to engage end-clients with a ***service ethos*** in mind: an attitude of courtesy, empathy, and respect; the minimization of unnecessary burden; the creation of highly satisfying ***service experiences***. The Hub gives Transport Canada the capabilities to instill that ethos, equip front-line staff, and implement a digital-service transformation strategy. The Hub makes client-centred service design the first stop in the development process, not an after-thought.

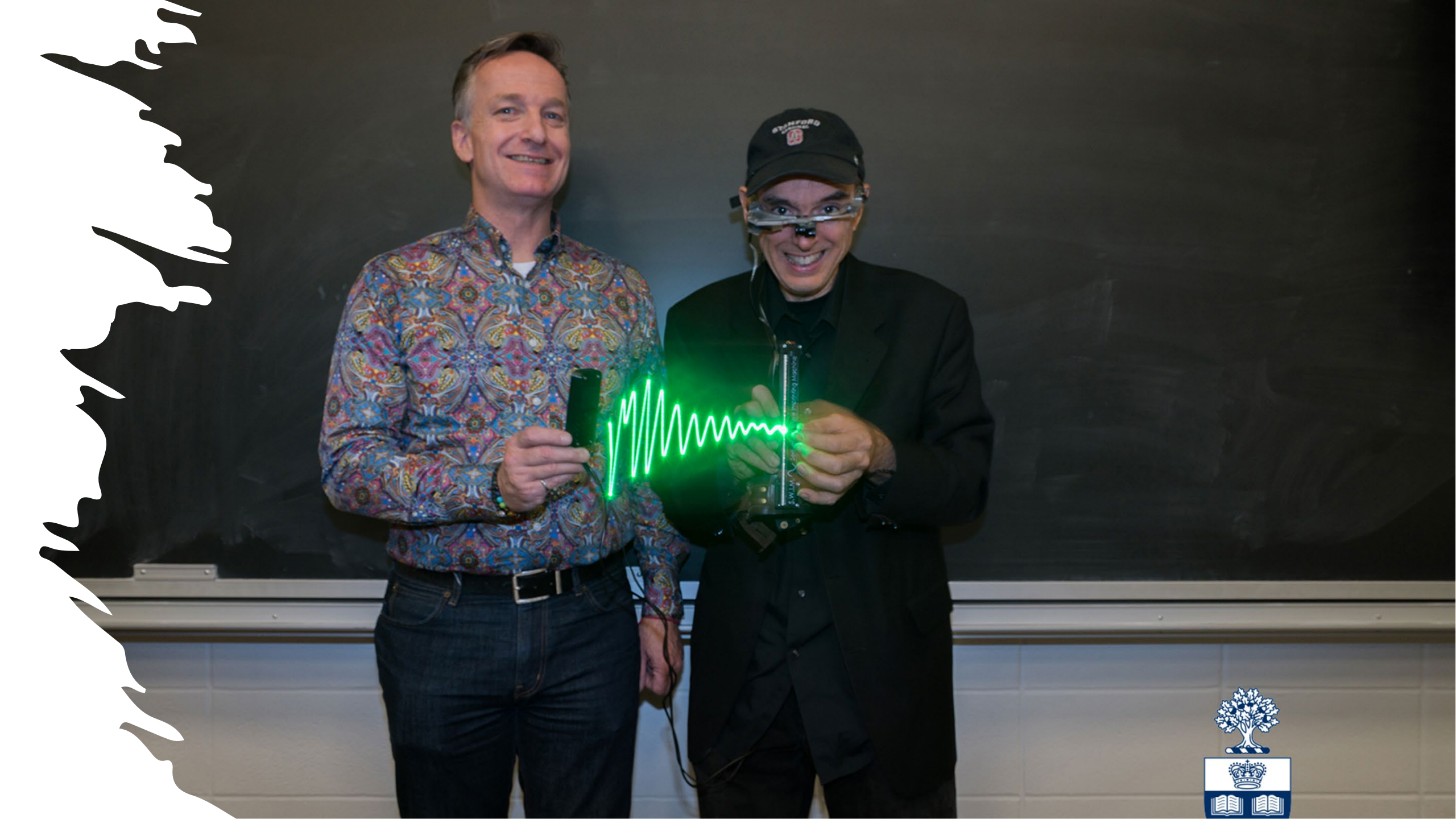
The Hub is that first stop for a crucial reason. Information technology projects often result in cost over-runs and a failure to live up to expectations. That can happen when developers do not fully understand the nature of the challenge early on. In this era of "agile" development where speed is the priority, new technology projects can fall into the ***build trap***. In the rush to meet project milestones, corners can get cut where it counts the most: making sure that the technology caters to real people and real-world circumstances in order to create worthwhile experiences. Projects that fall into this trap underwhelm and go under-used. Most need to be replaced long before their expected lifecycle is complete. The Hub has the capabilities to set technology projects on the right path and maintain that client focus.

This graphic illustrates The Hub's capabilities. It shows the journey of an internal-client striving to create better services for end-clients, all for the ultimate benefit of Canadians.



Looking Ahead


Courtesy of MAST


STANFORD

Bioengineering

Come on CANADA!

Innovate!

BCNET CONNECT

Microsoft

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@Thumbtackhead