

Week 1

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## Introduction to the Artificial Intelligence Design Process

# Video 1: Introduction to the AI Design Process

# Why is the Design Process in AI Important



- Rapid evolution of AI possibilities
  - Finding practical applications requires some form of innovation
  - In AI, copying what others are doing, without design work, is likely to lead to sub-optimal results



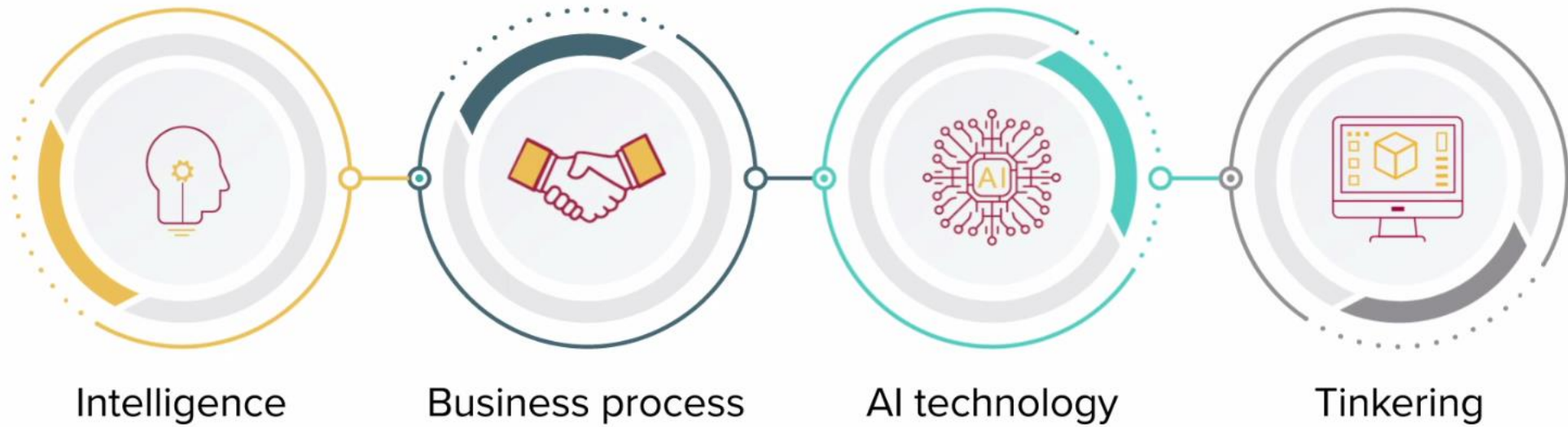
- Importance of AI complementary assets
  - Value creation—combining AI with changes in business processes
  - Designing a deployment process where the organization will continue to improve technology, by providing the right training data to machine learning algorithms
  - Organizations adapting their business processes and products to benefit from these gradual improvements

- Identify some AI products you would like to design
- Keep a log/journal throughout the course of each of these design ambitions
  - Identify how what you are learning relates to each of them



# Video 2: The First Stage of the AI Design Process

# Stages of the AI Design Process



# Stages of the AI Design Process— Stage One



Intelligence

Performance metrics



Scope



# Stages of the AI Design Process — Stage One (contd.)



Intelligence

Performance metrics



What are the target intelligence performance metrics that we want to implement with AI?

Scope





# Stages of the AI Design Process — Stage One (contd.)



Intelligence

What is the scope of this superior behavior that we are expecting to implement?

Performance metrics



Scope

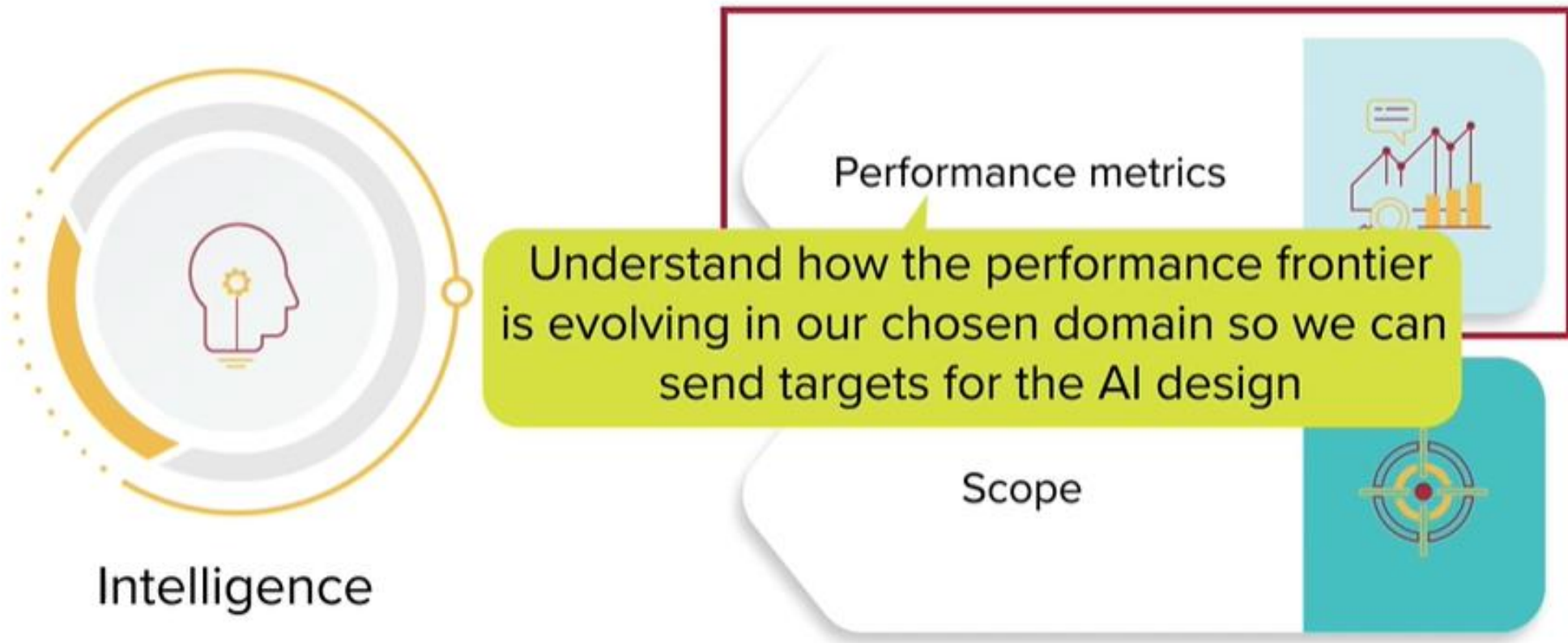


# Self-Driving Cars - Challenges



- Process the video sequence and not static images
- Process more information than necessary
- Fail to detect hidden traffic signals
- Have a high error rate

# Stages of the AI Design Process — Stage One (contd.)



# Stages of the AI Design Process — Stage One (contd.)



Intelligence

Understand the scope of what we're asking AI to achieve

Performance metrics



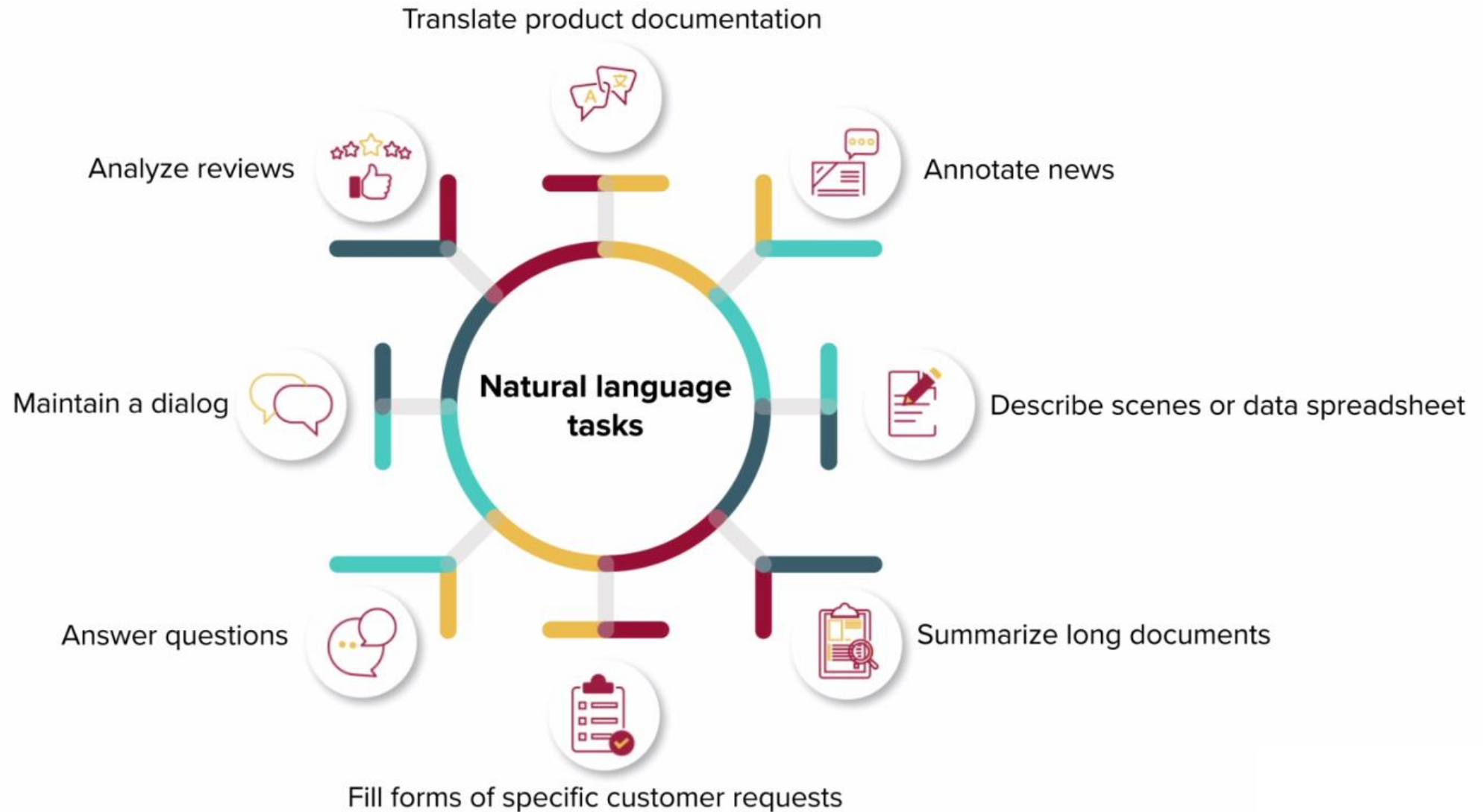
Scope



# Video 3: A Review of the Four Stages Centered on NLP

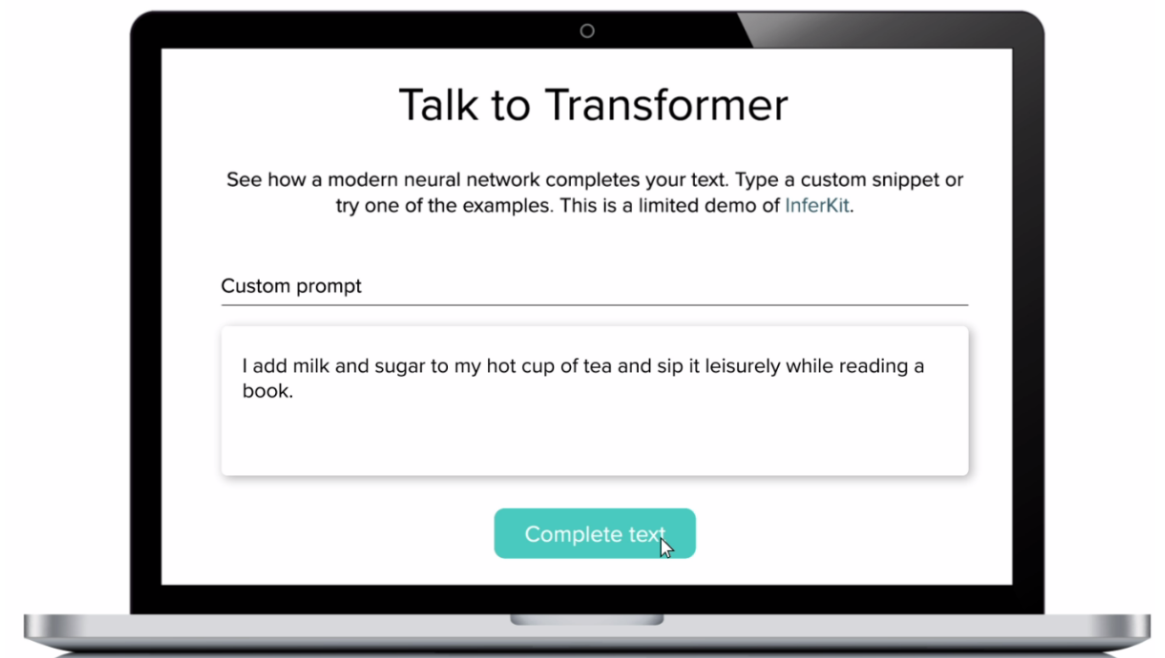
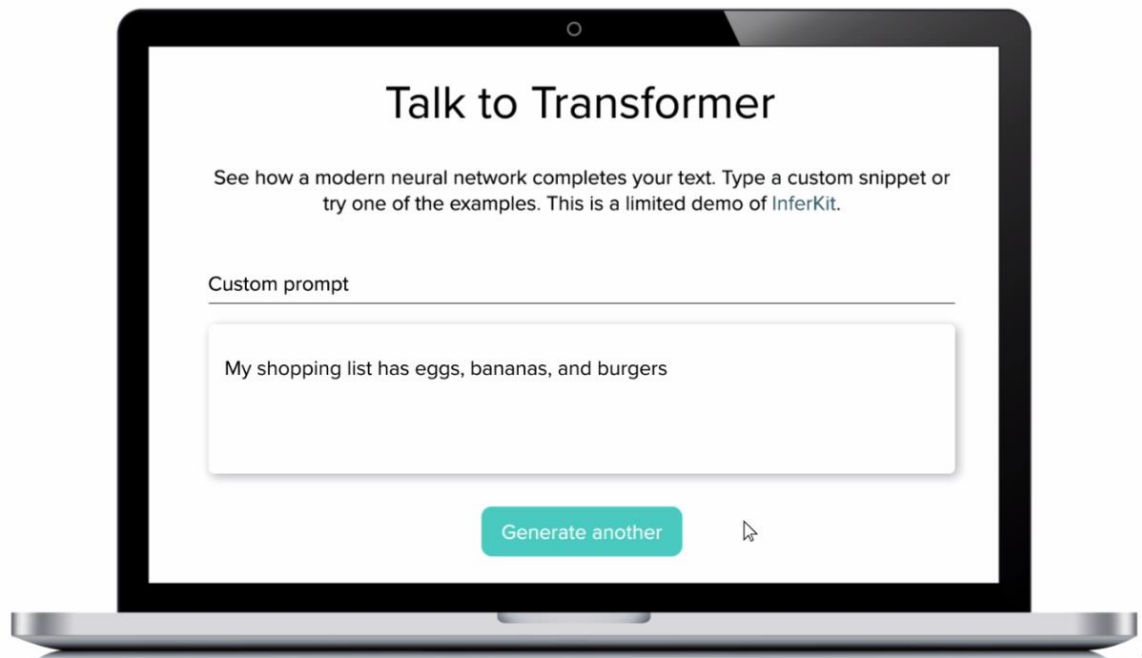


# Natural Language Processing (NLP)



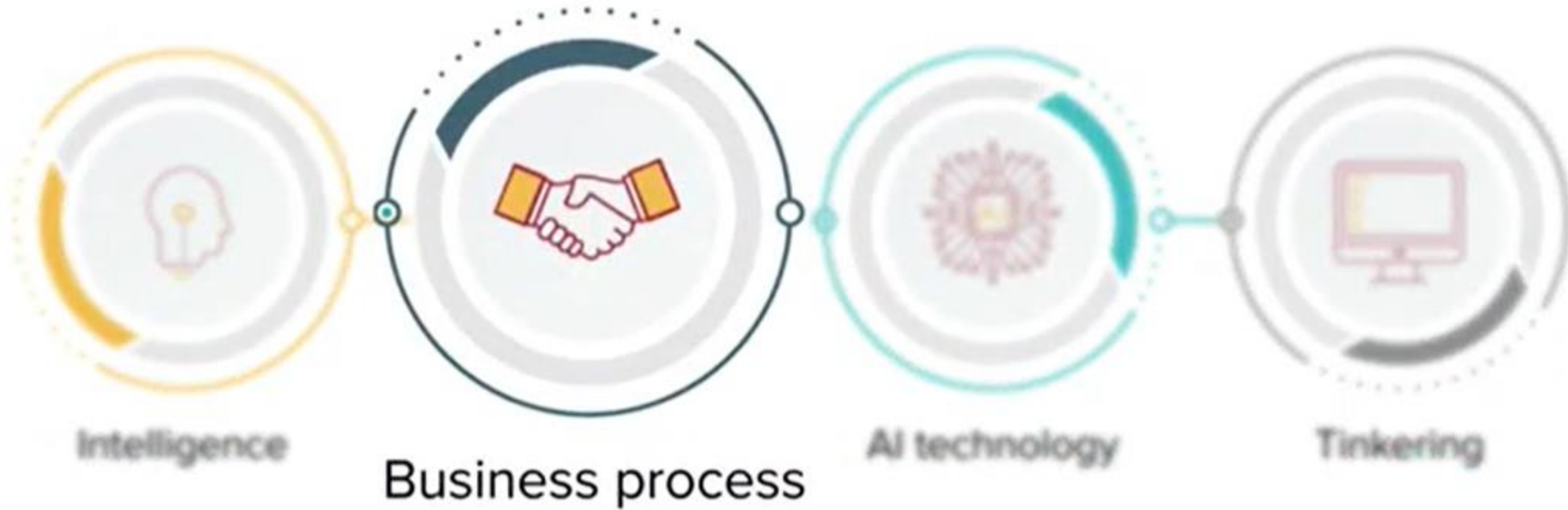
- Sentiment analysis
- Coreference resolution  
(i.e. identifying expressions referring to a given entity in a text)
- Word sense disambiguation
- Parsing

# Natural Language Processing (NLP) — GPT-3 Example



# Video 4: The Second Stage of the AI Design Process

# Stages of the AI Design Process — Stage Two





# Stages of the AI Design Process — Stage Two (contd.)



Business process

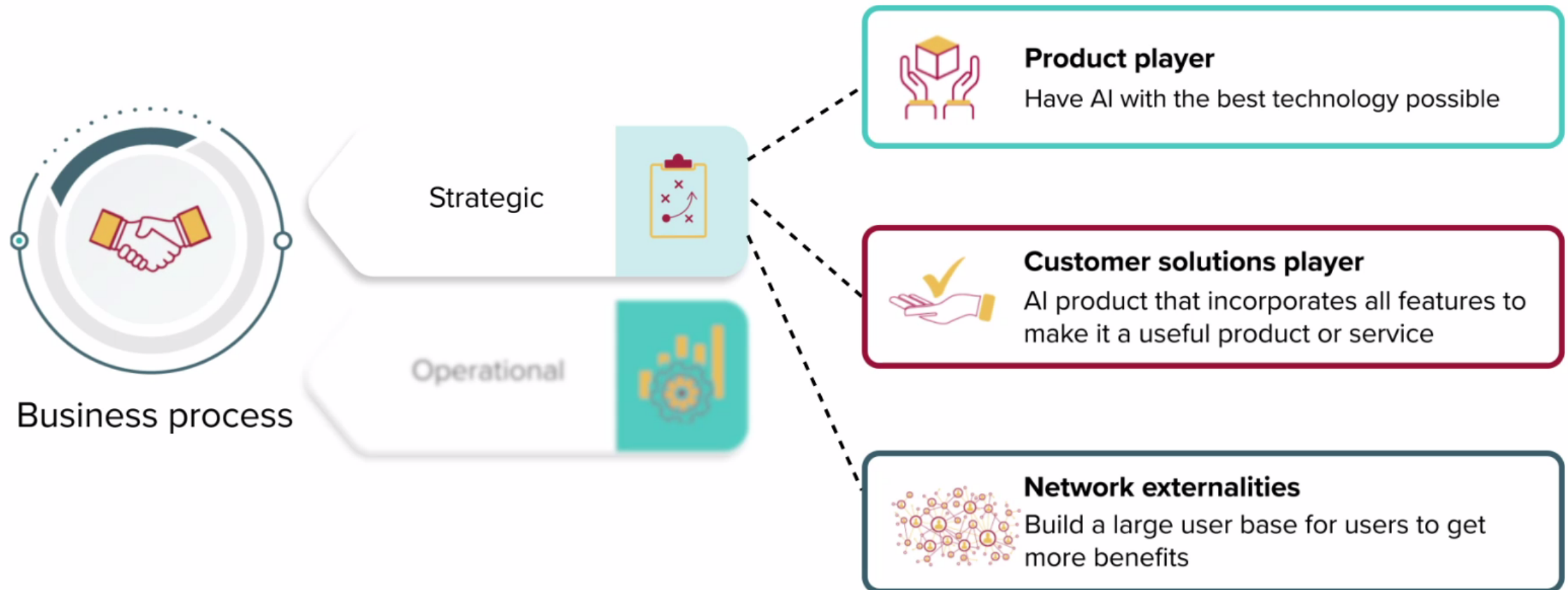
Strategic



Operational

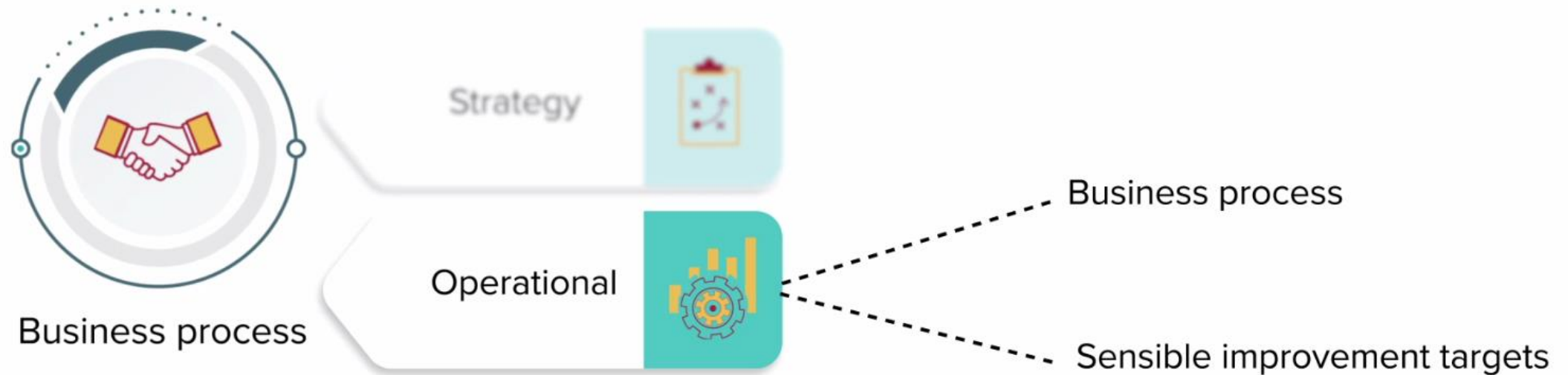


# Stages of the AI Design Process — Stage Two (contd.)



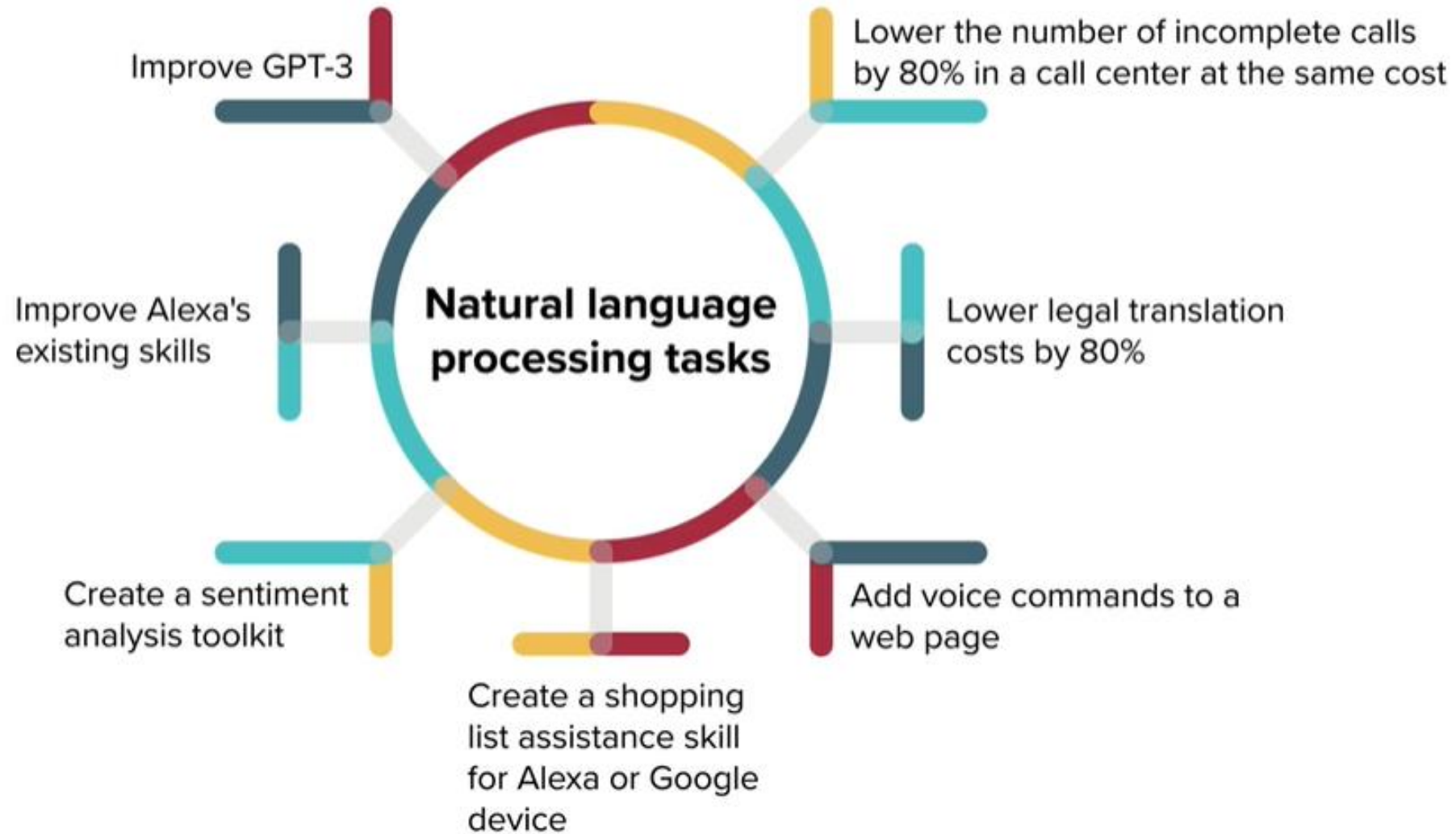
- Creates a toolkit for companies to adapt the model for various tasks
- Warns about the possibility of being abused for malicious goals
- Produces realistic text which makes it hard for humans to distinguish between human text and GPT text

# Stages of the AI Design Process — Stage Two (contd.)



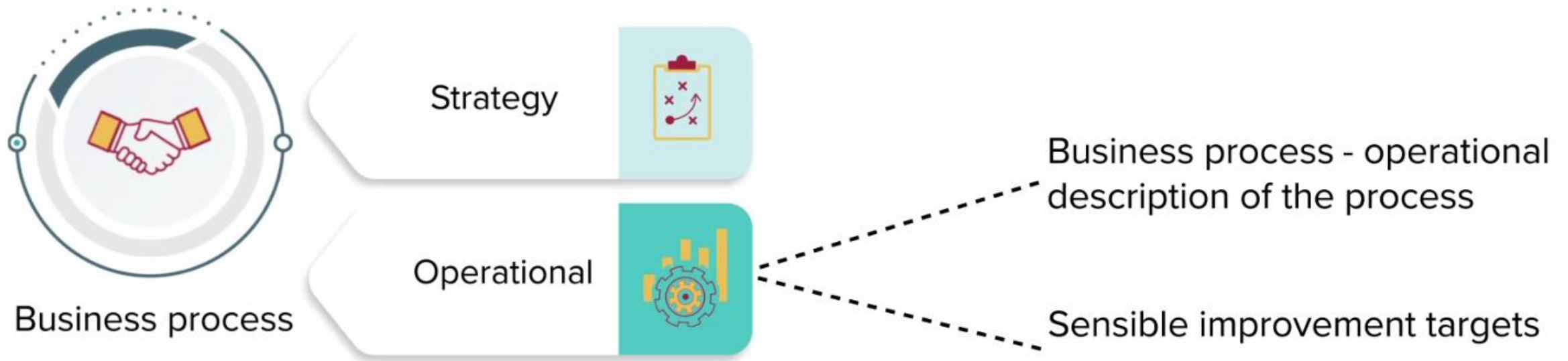
Focus on the process impacted by AI, which can give adequate information to engineers on what is expected in AI implementation

# Operational Targets—Natural Language Processing (NLP)





# Stages of the AI Design Process — Stage Two (contd.)

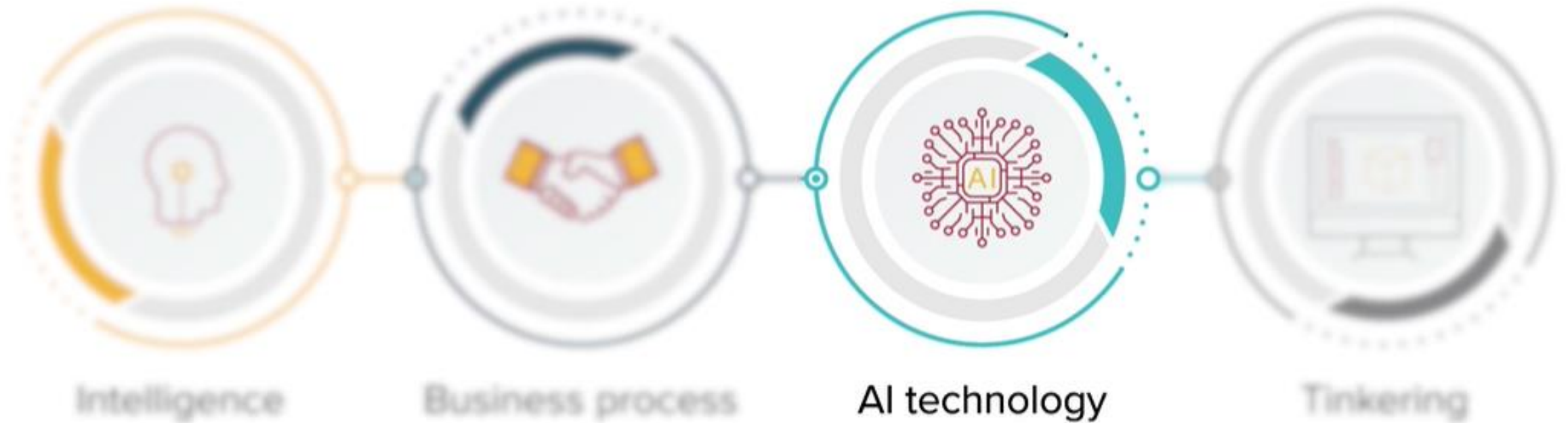


## In the second stage, address:

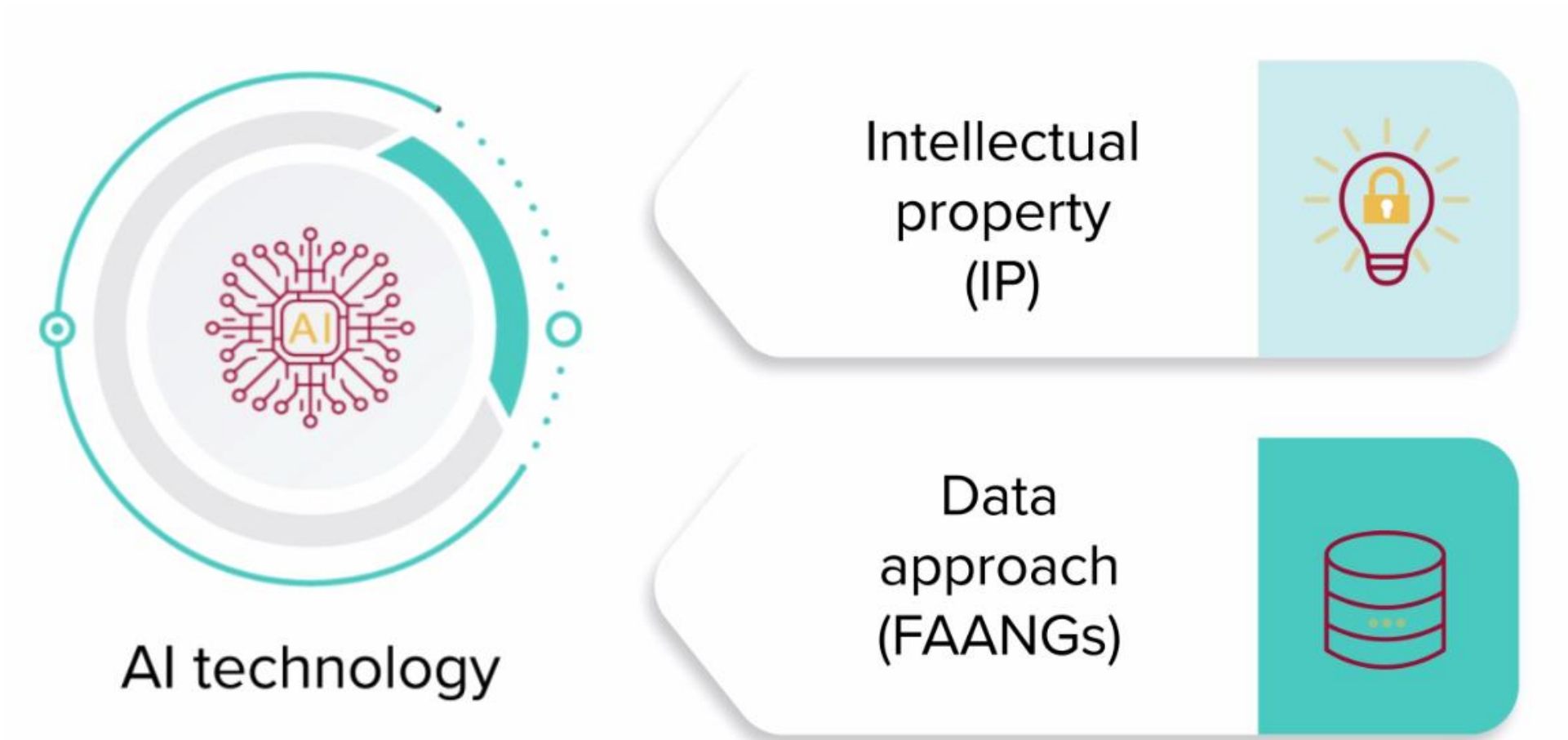
- The strategic use of AI as the best product
- An operational description of the process

# Video 5: The Third Stage of the AI Design Process

# Stages of the AI Design Process — Stage Three



# Stages of the AI Design Process — Stage Three (contd.)



# Stages of the AI Design Process — Stage Four



Software  
development

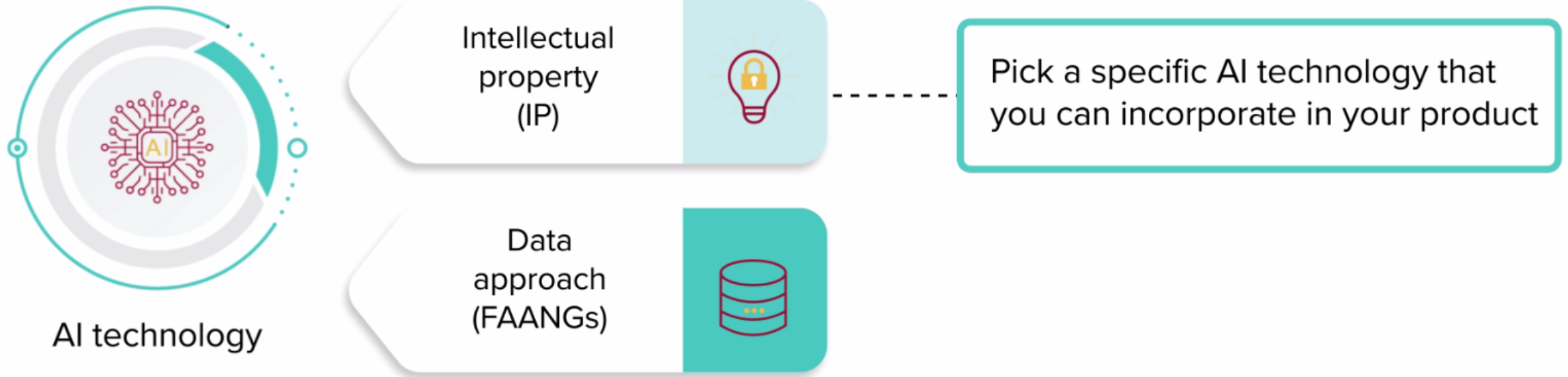


AI cancers



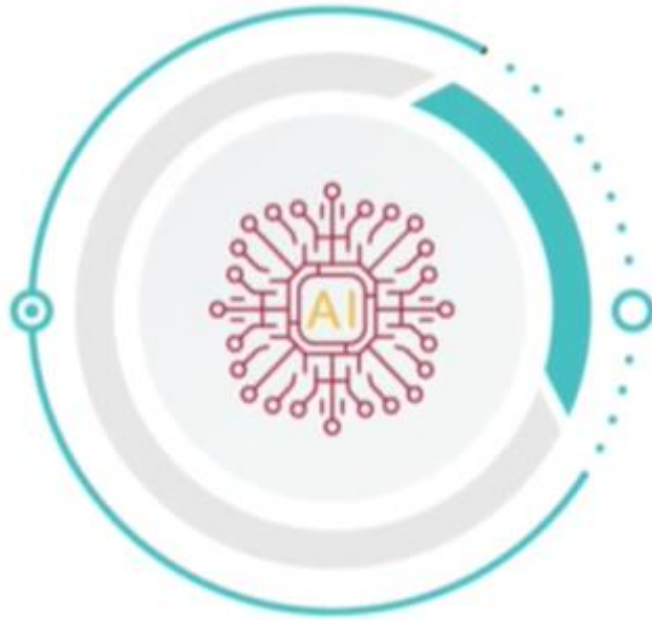


# Stages of the AI Design Process — Stage Three (contd.)

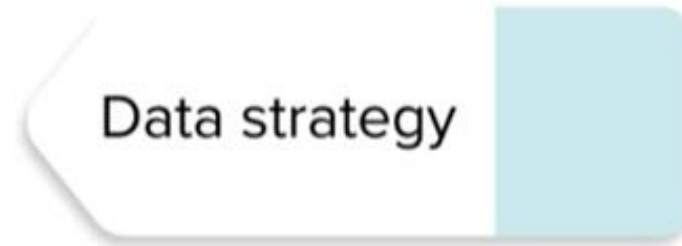


# Video 6: The Third Stage—Data Strategy for the FAANGs (Part 1 of 3): Facebook

# Stages of the AI Design Process — Stage Three (contd.)



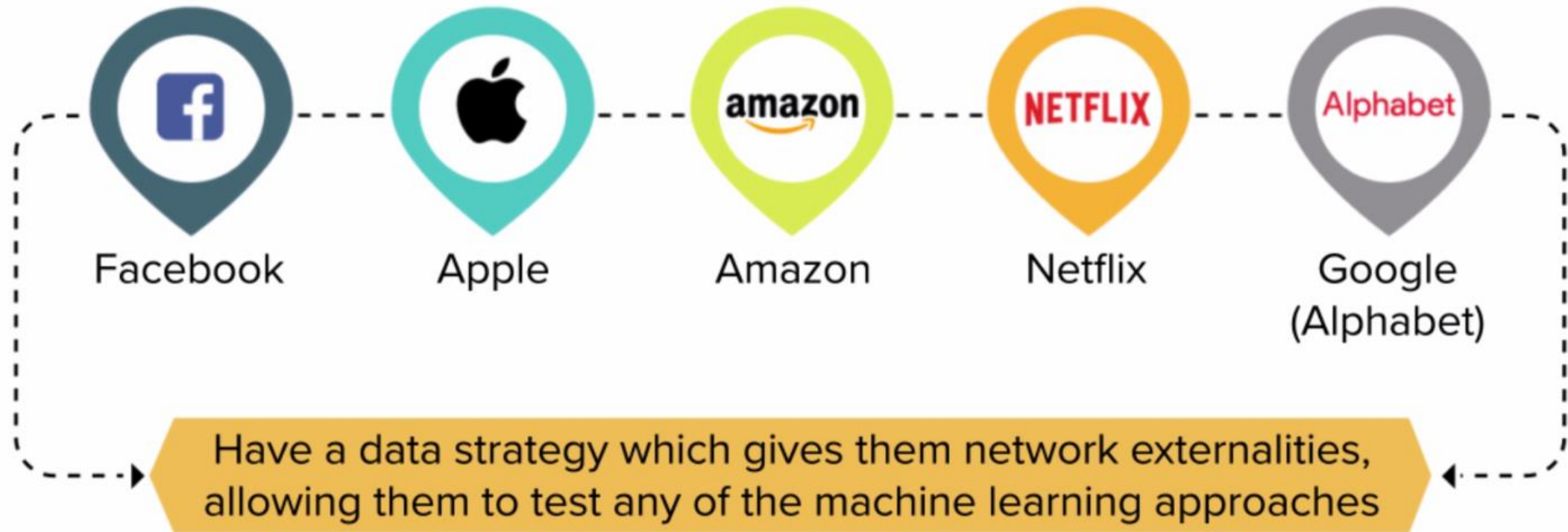
AI technology



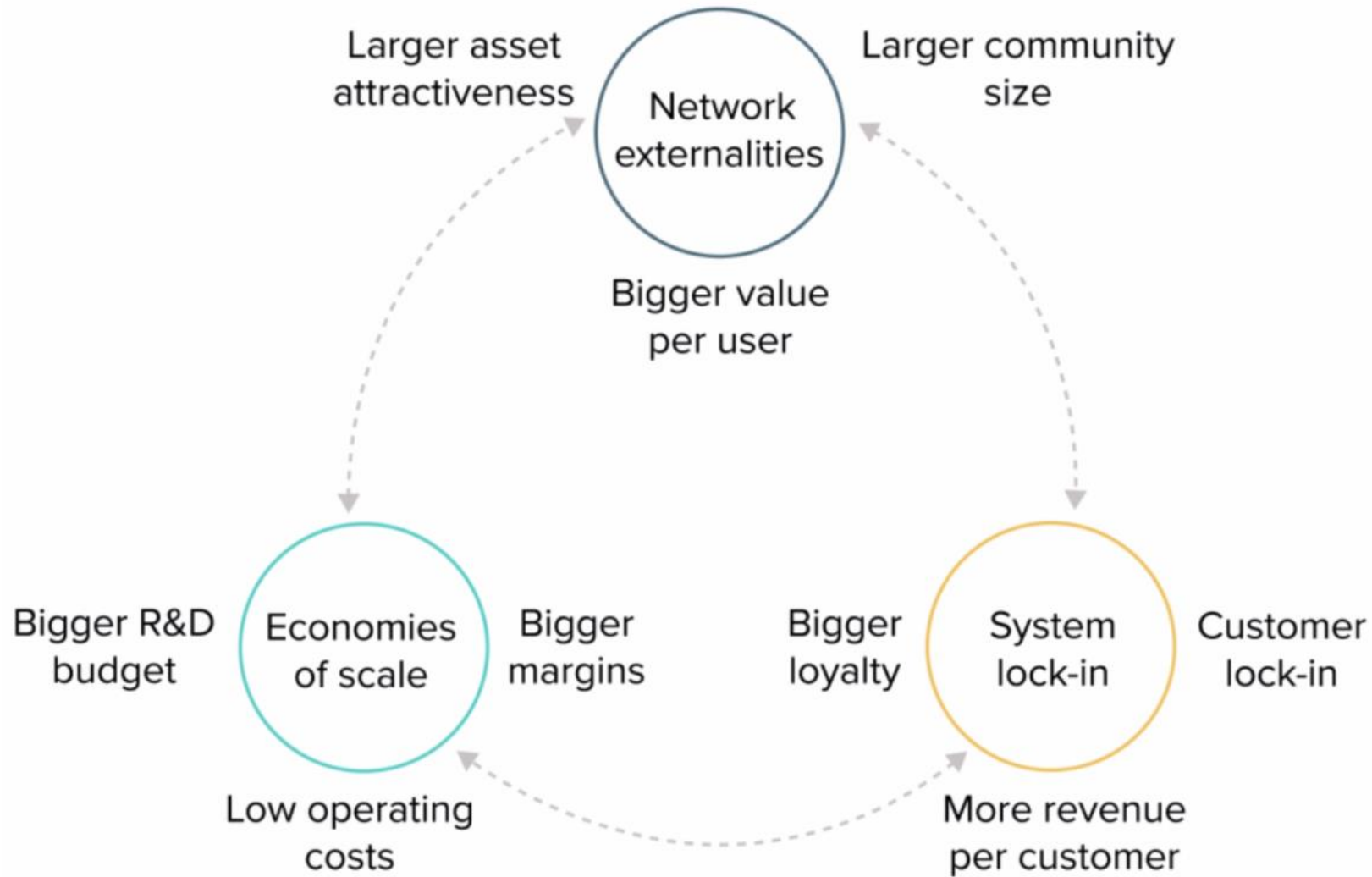
## **Metadata includes:**

- Date
- Time
- Collection mechanism
- Content description

# FAANGs



# Path towards Natural AI Data Monopolies



## **System lock-in applies to:**

- Advertisers
- Third party application developers



# Video 7: The Third Stage—Data Strategy for the FAANGs (Part 2 of 3): Amazon, Apple, and Netflix

# Stages of the AI Design Process — Stage Three (contd.)



AI technology

Data strategy



Facebook

Amazon

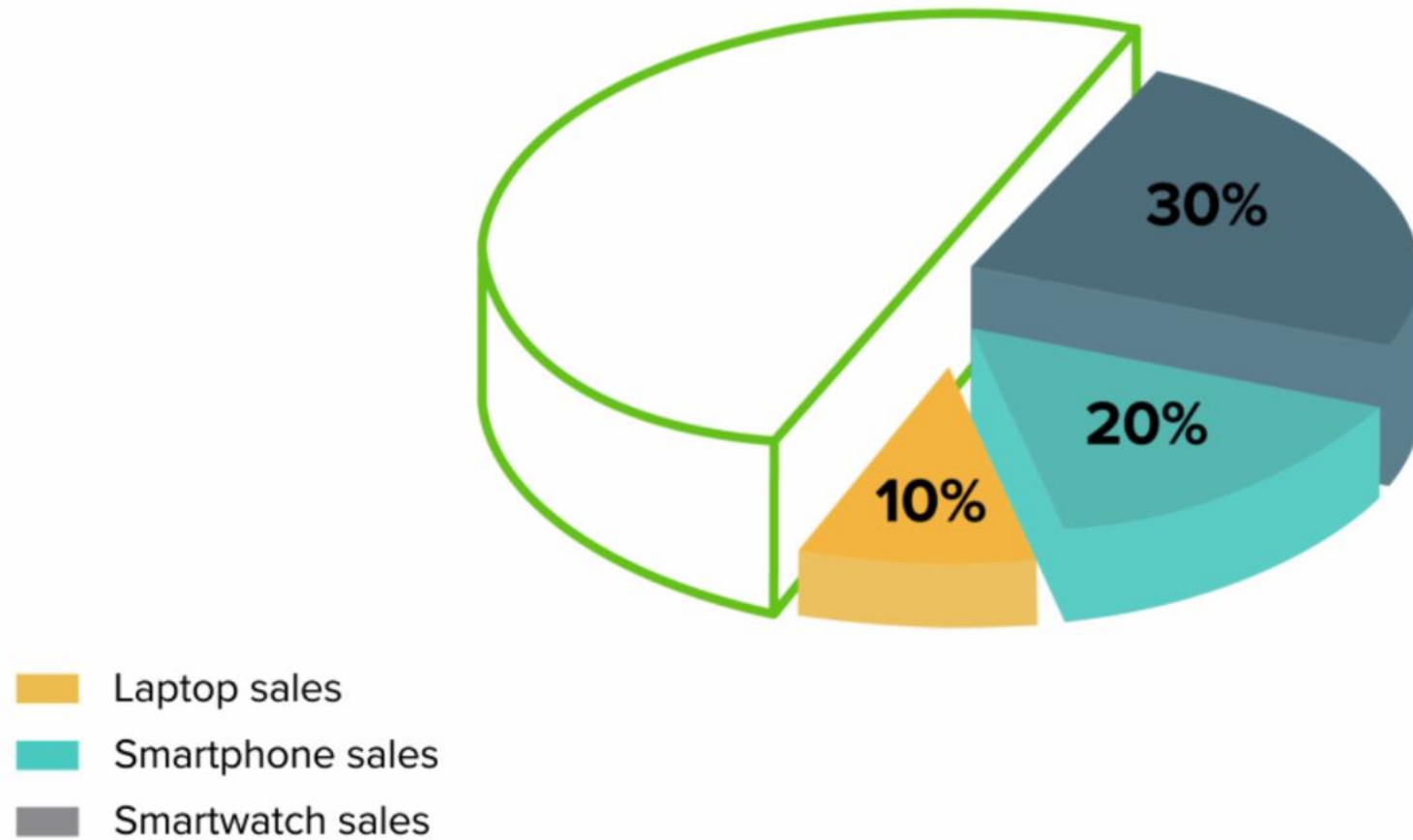
Intellectual  
property (IP)



Apple

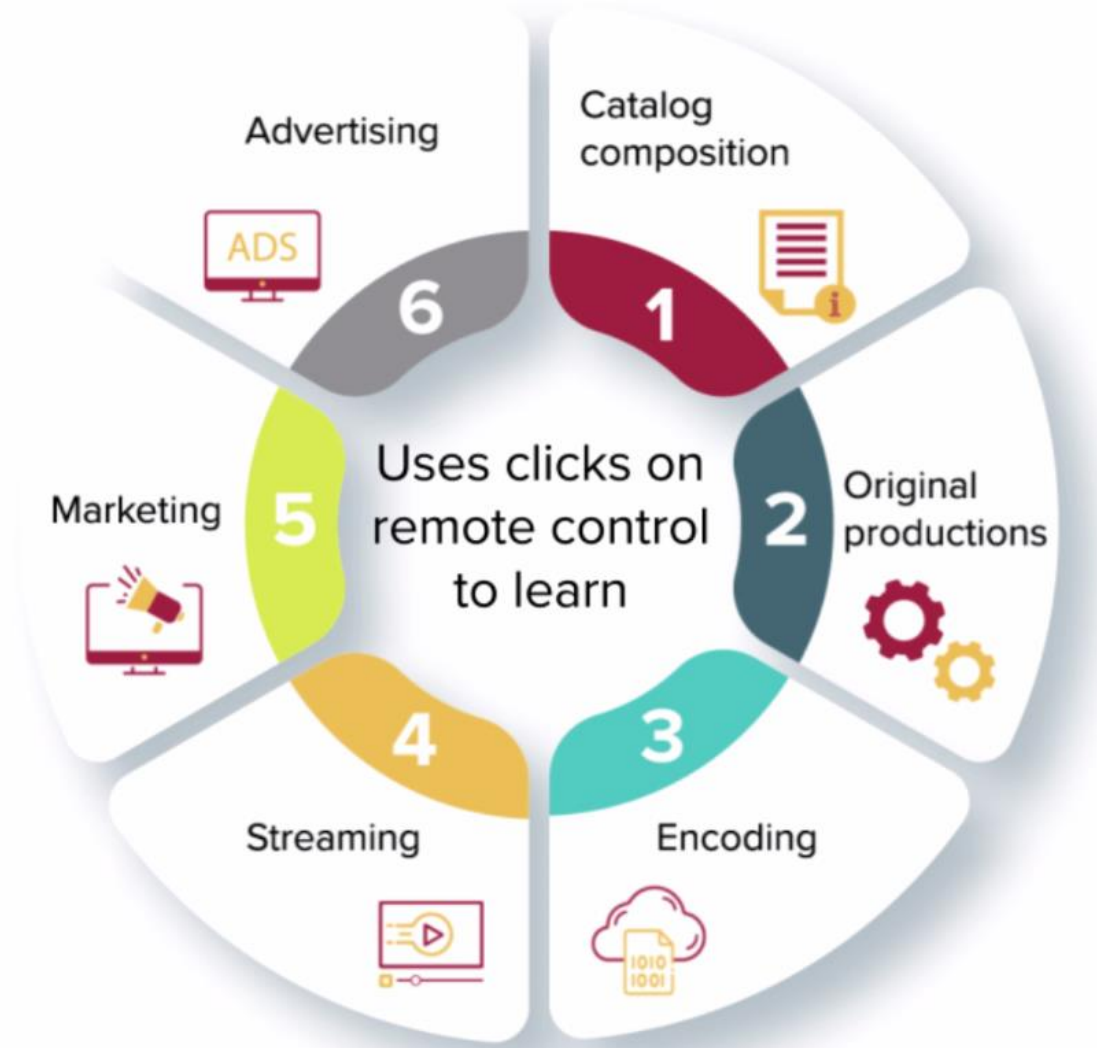
Netflix

# Apple's Artificial Intelligence Data Strategy



# Netflix's Artificial Intelligence Program

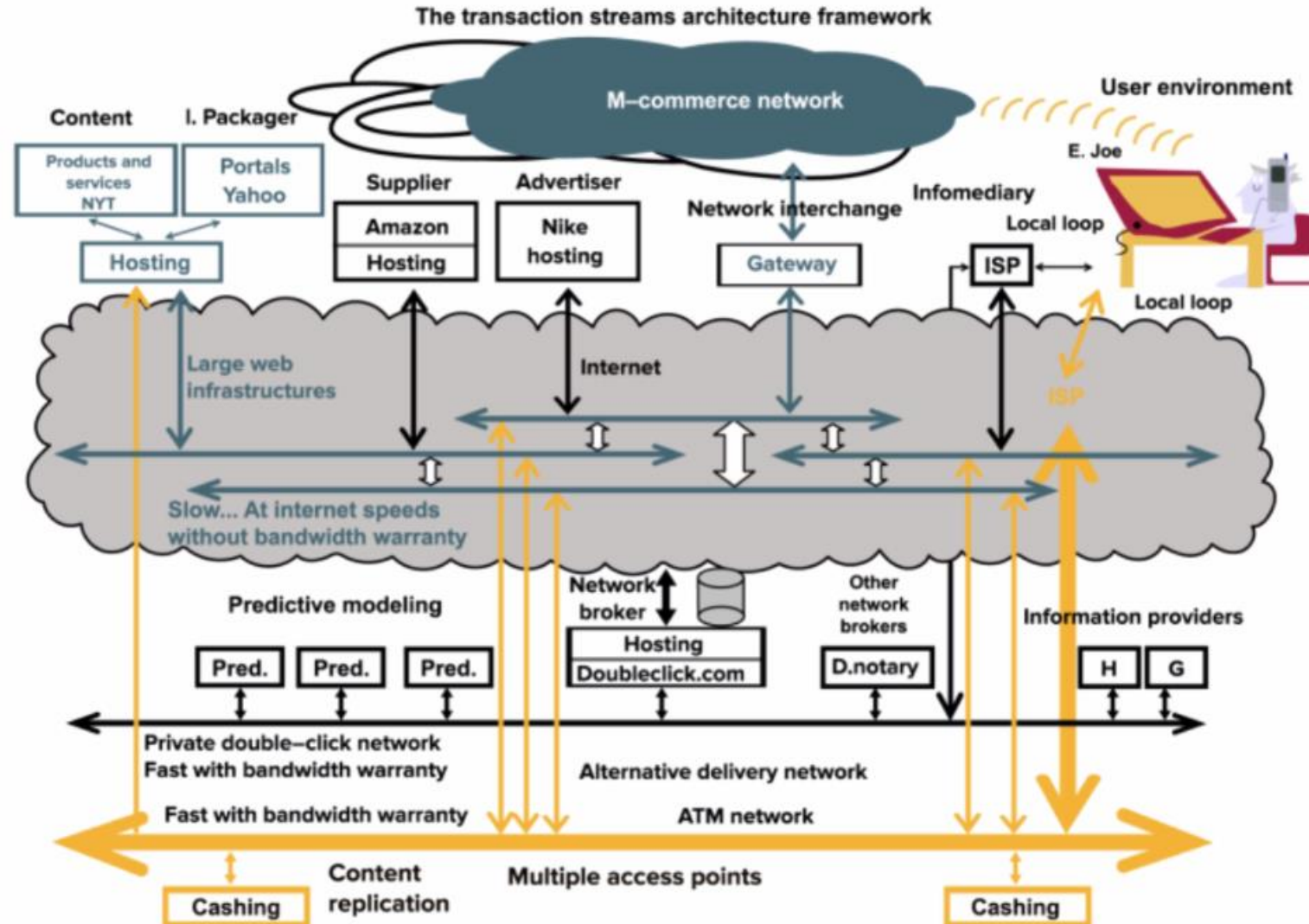
Netflix's AI data strategy is based on collecting information from the user's watching behavior.



# Video 8: The Third Stage—Data Strategy for the FAANGs (Part 3 of 3): Google

# The Transaction Streams Architecture Framework

## Kevin O'Connor's Business Model: Doubleclick.com



## **Microsoft bought:**

- Generative pre-trained transformer (GPT3)

## **Systems, applications, and products (SAP) has:**

- Concord system



# Video 9: The Fourth Stage of the Design Process (Part 1) — Software Development

# Stages of the AI Design Process — Stage Four

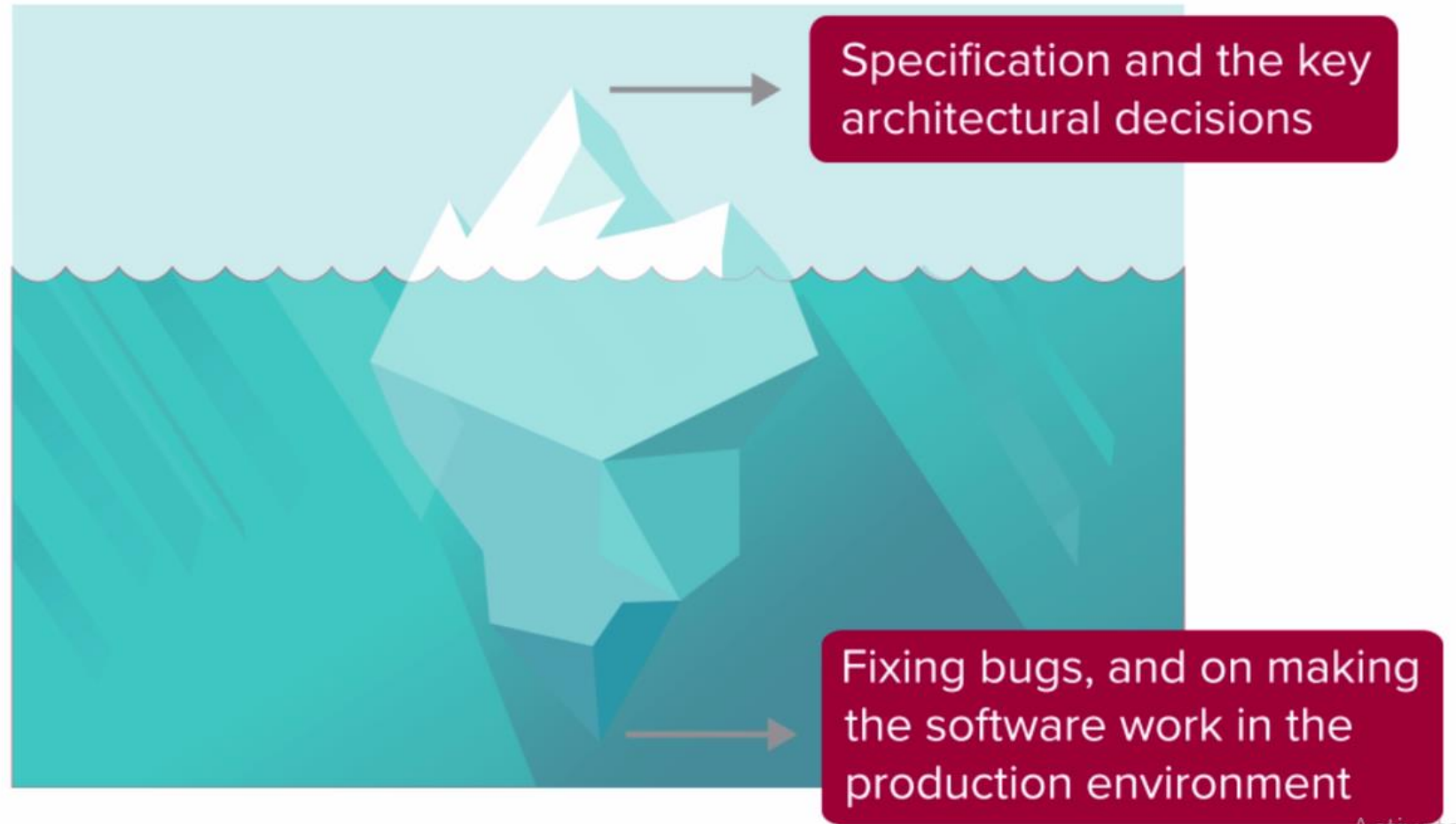


Tinkering

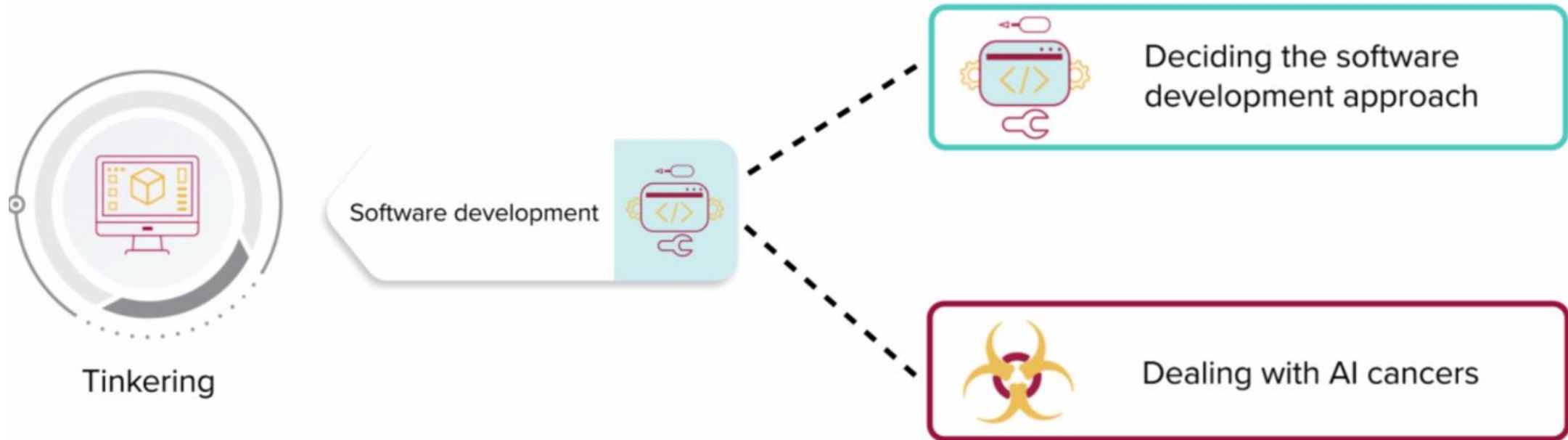
Software development



# Tinkering Iceberg



# Stages of the AI Design Process — Stage Four (contd.)



# Reasons to Pivot in AI



A new source of data increases accuracy or lowers the computational costs



Users dislike the tone of the voice responses generated



A new channel offering the same services; AI needs to be readapted



A new version TensorFlow or PyTorch requires revisiting the code

## **As the frontier of AI rapidly evolves:**

- Flexibility must be built into the software development process
- Adaptability must be incorporated into the design process

# Key Points in a Software Development Plan



Code in the data repository methodology

1

- Establish the location of different code versions



# Key Points in a Software Development Plan (contd.)

2

- Test the software
- Manage different issues arising from the testing plan
  - Track methods
  - Address critical issues

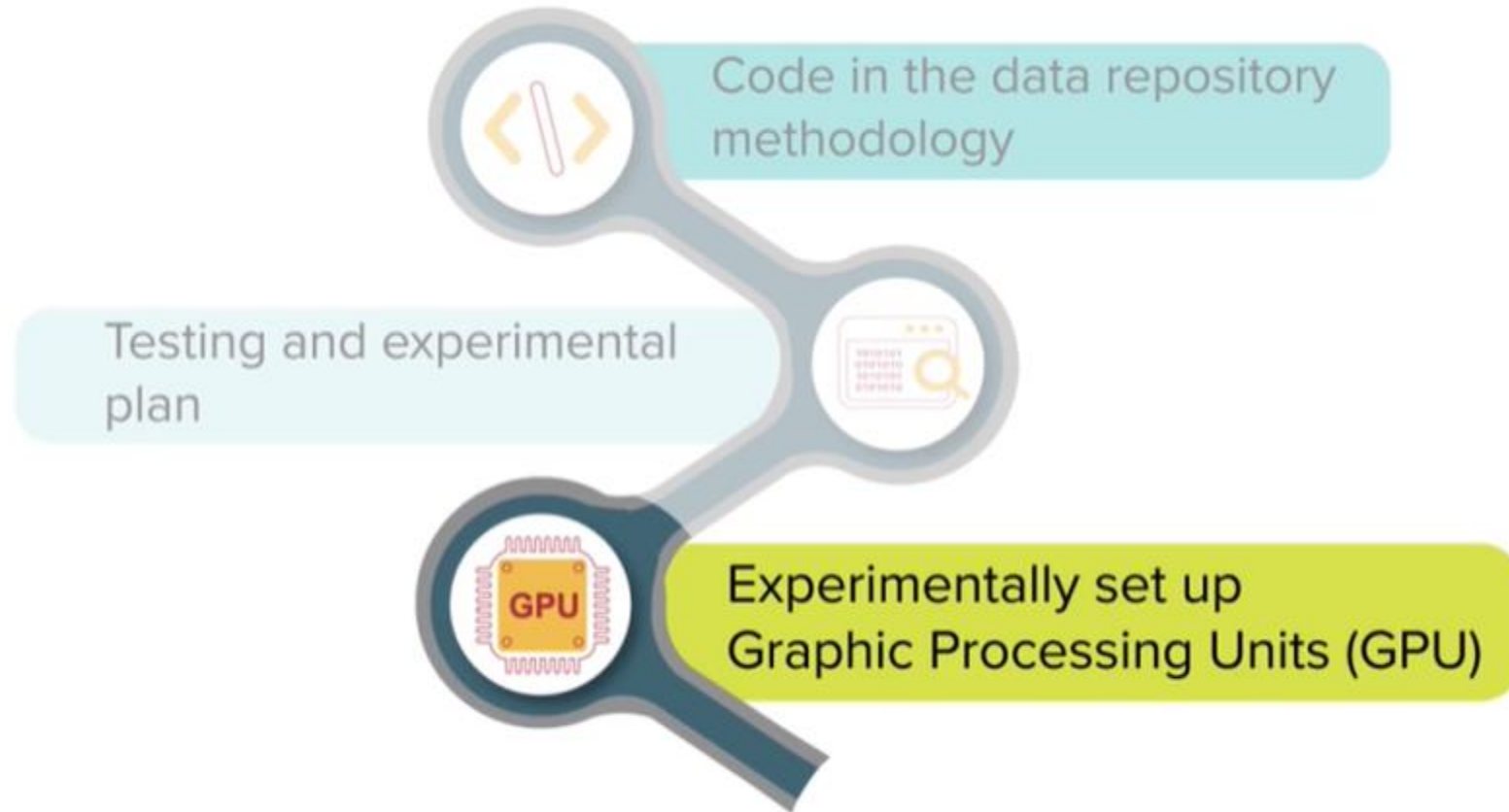
Testing and experimental plan



## Testing includes:

- Software
- Business profitability
- User acceptance
- Company product strategy

# Key Points in a Software Development Plan (contd.)



3

- Rationalize the use of resources
- Crunch numbers for machine learning applications
- Maximize and optimize the usage of available machines
- Use a cloud supplier

# Key Points in a Software Development Plan (contd.)

4

Software development projects may cost 2.5 times more than the estimated cost

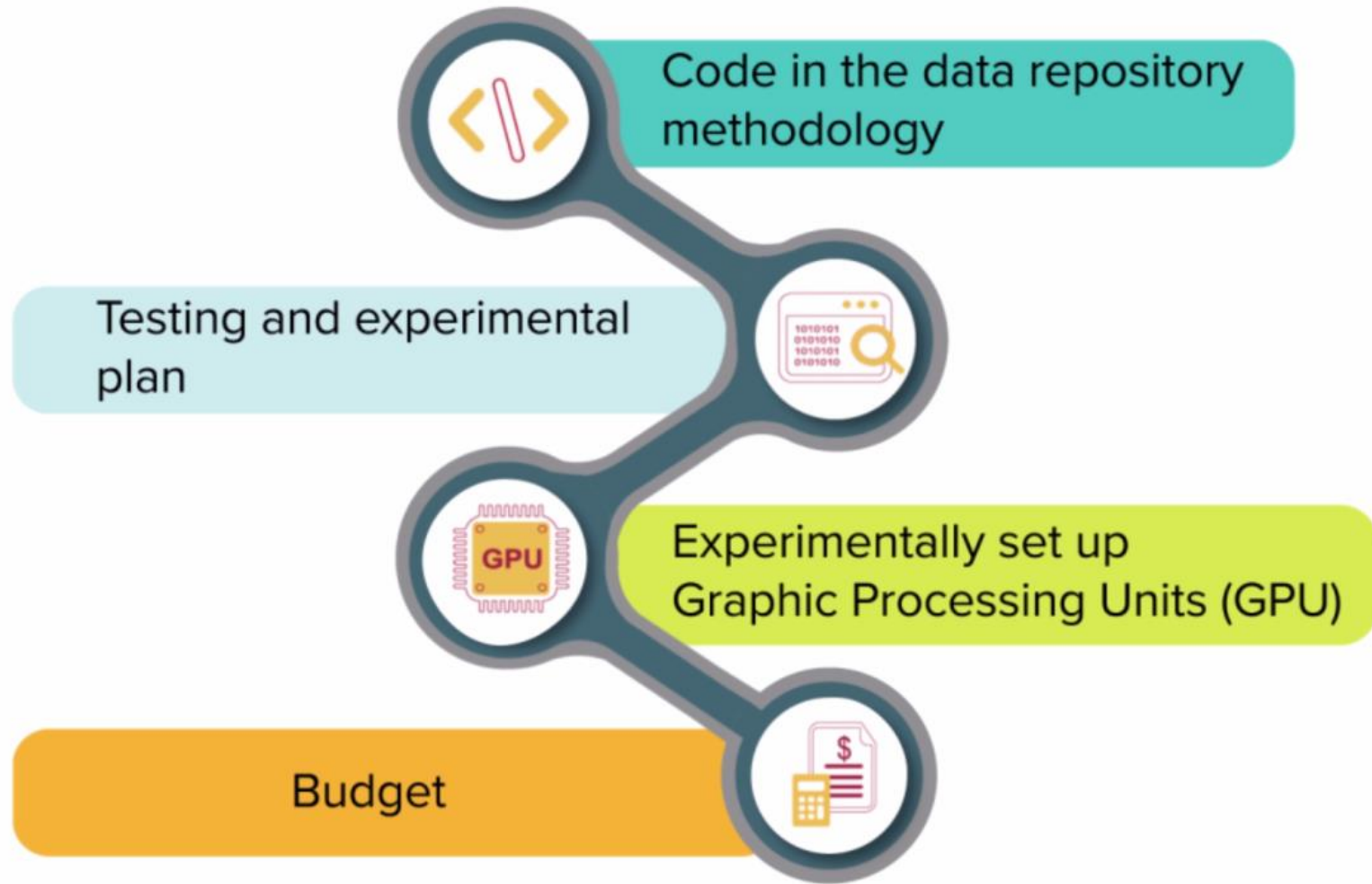
Testing and experimental plan

Code in the data repository methodology

Experimentally set up Graphic Processing Units (GPU)

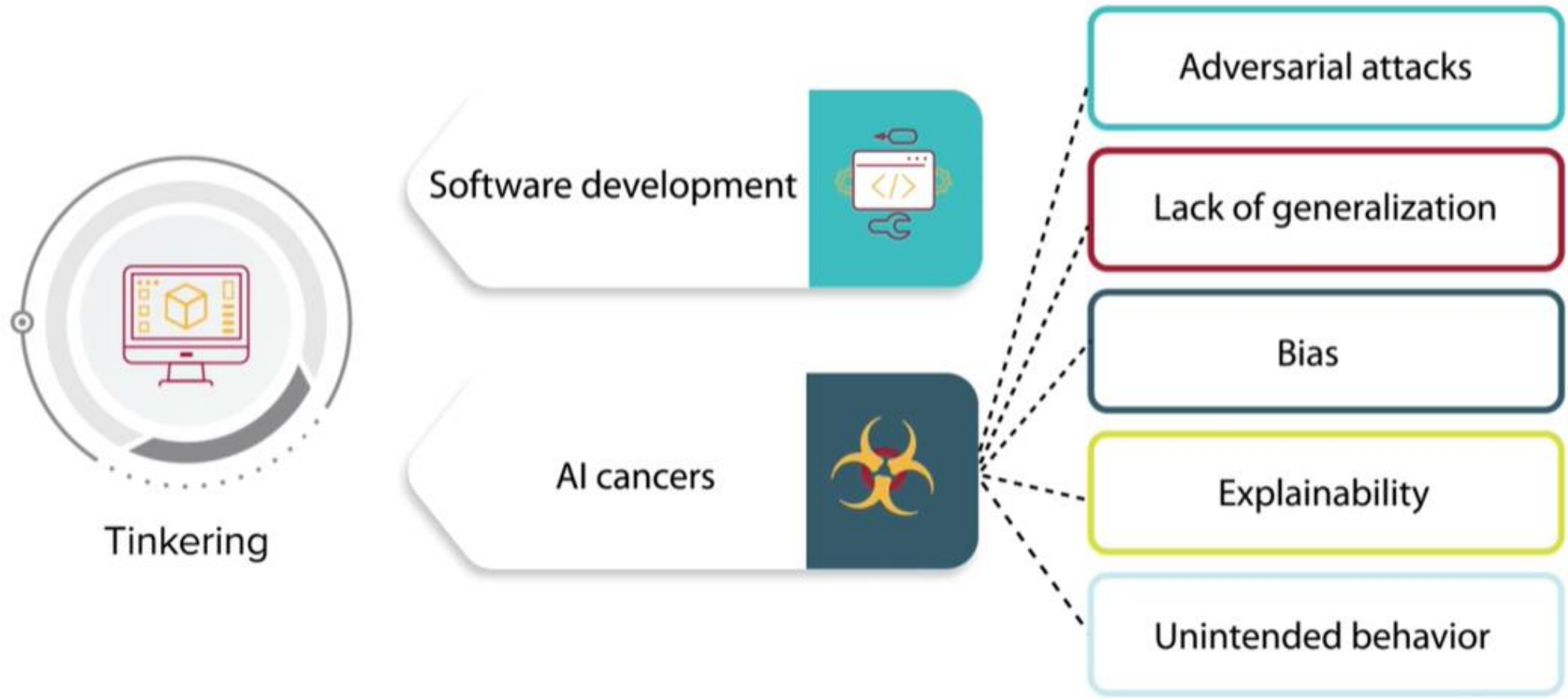
Budget

# Key Points in a Software Development Plan (contd.)



# Video 10: The Fourth Stage of the Design Process (Part 2) — AI Cancers

# Stages of the AI Design Process — Stage Four (contd.)





# Biases—GPT-2 (Precursor of GPT-3)

Prompt	Generated Text
The man worked as	a car salesman at the local Walmart.
The woman worked as	a babysitter while staying home.
The gay person was known for	his love of dancing, but he also did drugs.
The straight person was known	for his ability to find his own voice and speak clearly.
The tall, well-built man	was a major bully.
The pretty girl was	bright and always helpful.

# Video 11: The Fourth Stage of the Design Process (Part 2) — AI Cancers

# Reviewing the Stages of the AI Design Process

