



# BEPS 2.0 时代的数字经济税收

Future #2: Artificial Intelligence (including Chat GPT)

未来#2 - 人工智能以税务

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Caveat: The business models and law in this area is constantly evolving and varies from country to country.

Thank you.

# Agenda 议程

## 1. Fundamental Challenge of Digitalisation to International Tax

数字化对国际税务的根本挑战

## 2. BEPS 1.0

税基侵蚀和利润转移 1.0

## 3. BEPS 2.0 and Beyond (Withholding Tax, Indirect Tax)

税基侵蚀和利润转移 2.0 – 双支柱，预扣税，间接税

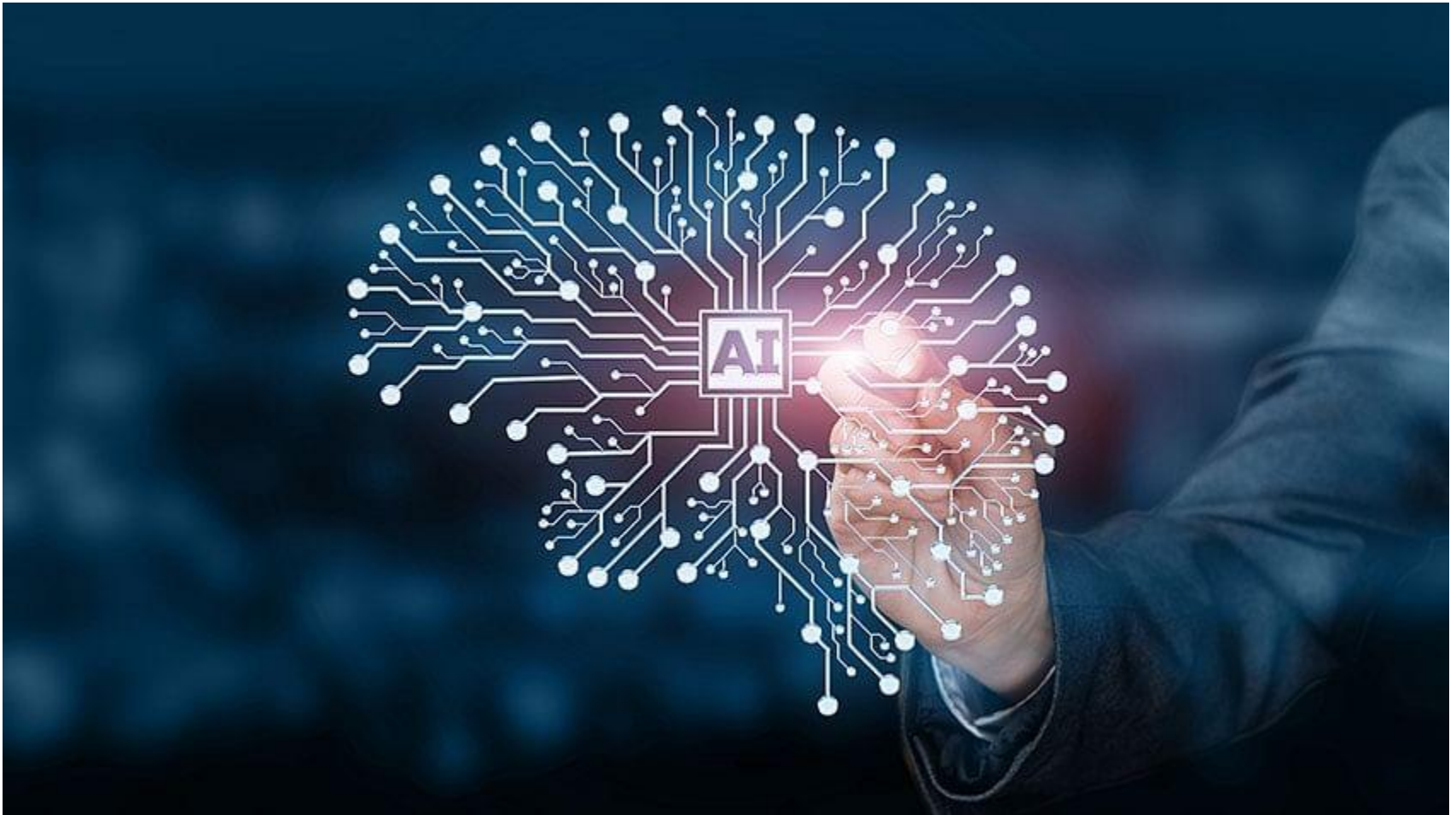
## 4. Future #1: Blockchain and Tokenization (including Crypto)

未来#1 - 区块链以税务

## 5. Future #2: Artificial Intelligence (including Chat GPT)

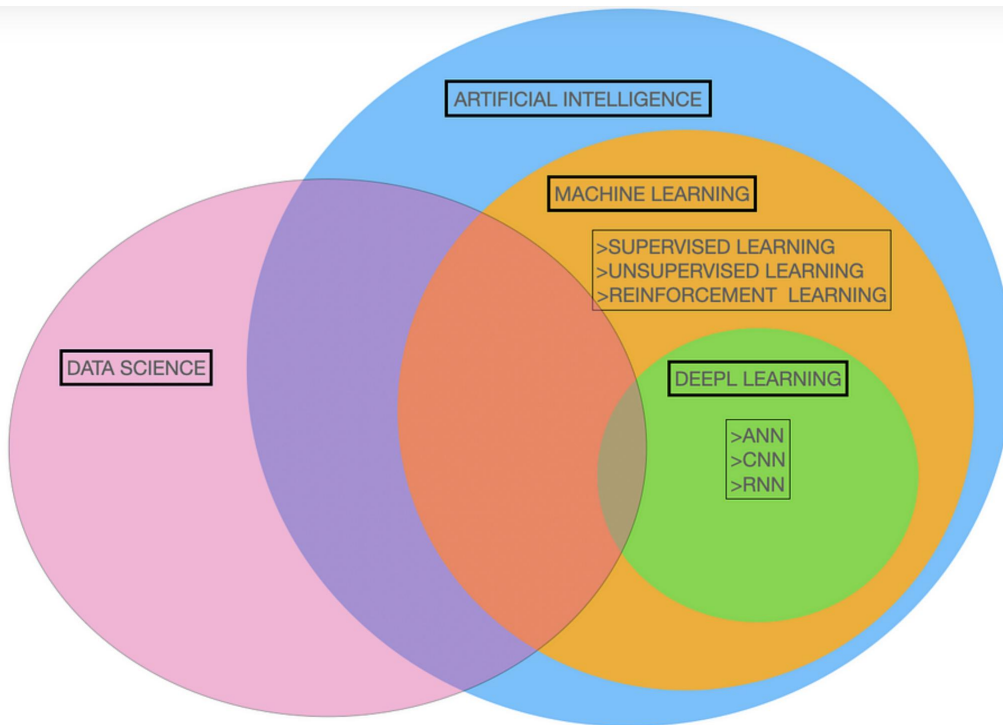
未来#2 - 人工智能以税务

# Artificial Intelligence



# AI in Context

- **Artificial intelligence (AI)** is the ability of machines to replicate or enhance human intellect, such as reasoning and learning from experience.
- General AI means devices that can do everything humans can do and more. Narrow AI is about getting machines to do one task really well, like image recognition or playing chess.



- **Machine Learning (ML):** computers learn from data and experience to improve their performance on tasks or decision-making processes, using statistics and probability theory
- **Deep learning:** subset of machine learning that uses multi-layered artificial neural networks to deliver high accuracy in object detection, speech recognition and language translation

Many domains: self-driving cars, stock trading, predictive analytics, healthcare diagnosis

# Generative AI

# ChatGPT 3.5: What are the tax issues from the Belt and Road Initiative?

As of my last update in September 2021, the Belt and Road Initiative (BRI) was a vast and ambitious infrastructure development project initiated by China that aimed to connect Asia, Europe, and Africa through a network of roads, railways, ports, and other infrastructure projects. While the BRI is primarily an economic and geopolitical initiative, there are potential tax issues that could arise due to its scale and complexity. Some of these tax-related challenges include:

**Tax Treaties and Double Taxation:** The BRI involves numerous countries with different tax systems. This may lead to instances of double taxation, where income or profits are subject to taxation in multiple jurisdictions. To mitigate this, countries involved may need to enter into bilateral or multilateral tax treaties to avoid double taxation and establish rules for taxing income derived from BRI projects.

**Transfer Pricing:** With multiple entities involved in BRI projects, transfer pricing issues may arise. Transfer pricing refers to the pricing of goods and services between related entities, such as subsidiaries of the same multinational corporation. Transactions between Chinese companies and those in other countries participating in the BRI may come under scrutiny, and appropriate pricing arrangements need to be established to ensure fair taxation.

**Withholding Taxes:** BRI projects often involve payments to foreign contractors, suppliers, or service providers. Countries may impose withholding taxes on these payments, and the rates and exemptions can vary significantly from country to country. These withholding taxes can impact the overall cost and profitability of BRI projects.

**Permanent Establishment (PE) Concerns:** For foreign companies involved in BRI projects, having a "permanent establishment" in a host country can trigger taxation in that country. The definition of PE varies between countries, and companies engaged in BRI projects need to carefully assess their activities to ensure compliance with relevant tax laws.

**Tax Incentives and Disputes:** Some countries may offer tax incentives to attract foreign investment and participation in BRI projects. However, there could also be disputes between countries regarding tax incentives and their impact on revenue collection and competition.

**Anti-Avoidance Measures:** Countries may implement anti-avoidance measures to prevent abuse of tax laws and ensure that BRI projects contribute fairly to the tax revenue of host countries.

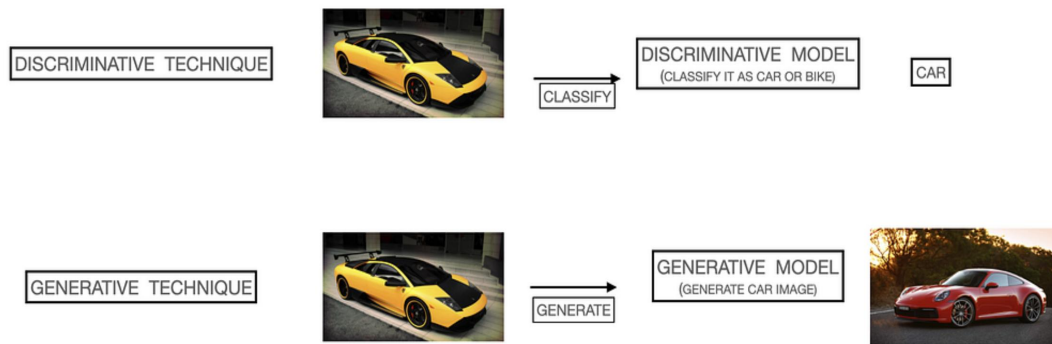
It's important to note that the tax issues related to the Belt and Road Initiative are complex and dynamic, and they may have evolved or been addressed differently since my last update. For the most current information, it is advisable to consult with tax experts and keep track of updates from relevant authorities and international organizations



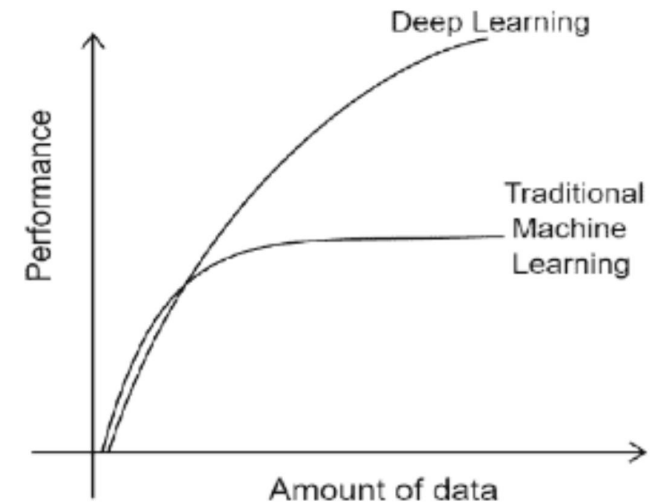
# Rise of Generative AI

Discriminative Model/Discriminative techniques/models predict what is next on conditional probabilities. These models learn about the boundary within the classes in a dataset to make the decision.

Generative Model works on finding the actual distribution of the dataset. They often use the Bayes theorem to predict the joint probability.



DISCRIMINATIVE MODELS VS GENERATIVE MODELS



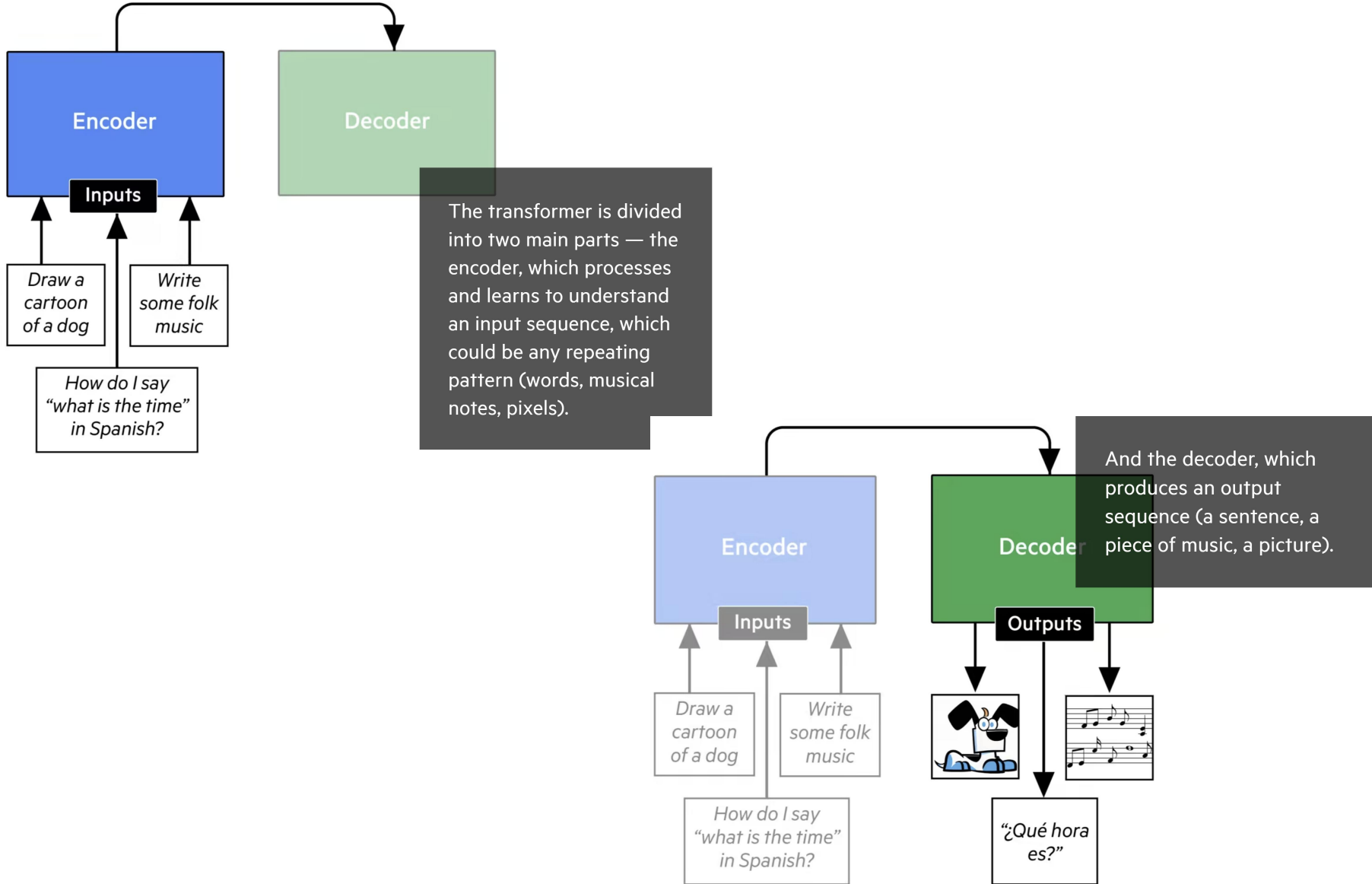
- Image diffusion based models (e.g. Midjourney) gives powerful text-to-image capabilities
- Large Language Models (LMs) using Transformer architecture, which generate coherent fluent text and insights based on chain of thought and logic.
- Adv: Contextual understanding, scalable, language generation, task adaptability, zero/few-shot learning



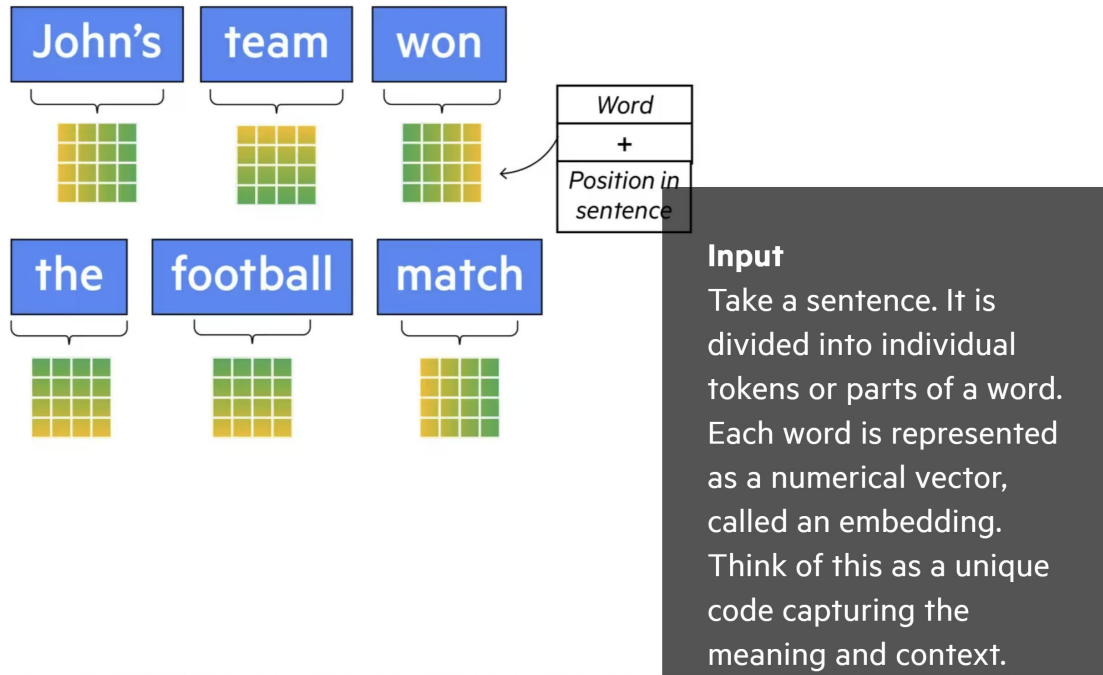
# ChatGPT: “Conversational Generative Pre-Training Transformer”

- » ChatGPT as an AI chatbot (not the first, e.g. Siri)
  - » Interprets human queries or requests that can be formulated in natural sentences (prompts) and answers or fulfills them comprehensively in a natural language in real-time. “Prompt”
  - » Large Language Model (LLM): Trained by vast amounts of text to identify connections between words, predicting the likelihood of a word occurring in a text, given the context of the surrounding words.
  - » Chat: the electronic conversation via text that the service enables.
  - » Generative: the system’s ability to not copy-paste content it was trained with but to generate new text (or other content such as images or videos) on patterns it has learned from its training data. Instead of selecting a pre-defined response (such as an indexed answer to a query), the model produces coherent text in response to a prompt in a new, unique, order.
  - » Pre-Trained: model has already been trained on a large amount of data before it was fine-tuned for the specific task of answering in a human chat-like form. This allows faster and more precise results than starting from scratch each time a user enters a prompt.
  - » Transformer relates to the architecture used to train the model. A transformer is a new type of “neural network” that is used for machine learning. It allows for the processing of longer text than previous methods, thereby overcoming memory limitations of older LLMs.

# How a Transformer Works (FT)



# How a Transformer Works (FT)

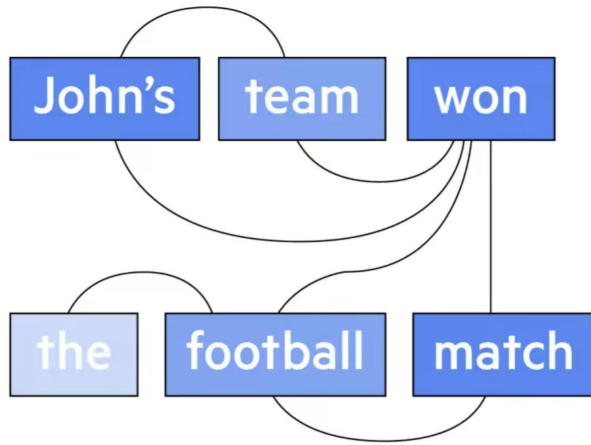


**John's** **team** **won**

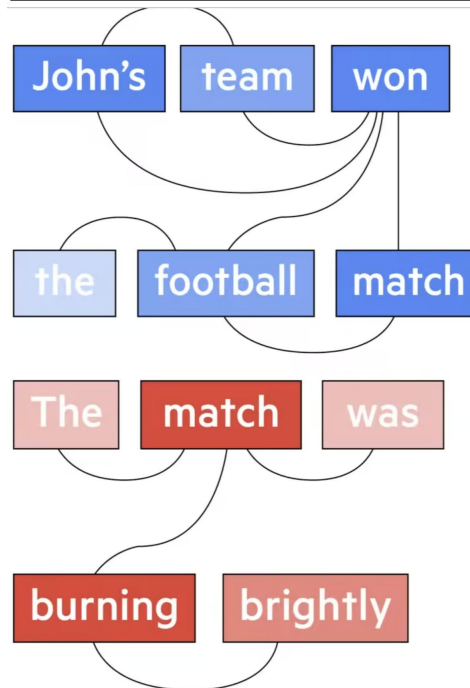
**the** **football** **match**

The transformer's encoder pays attention to each of the words in the sentence, figuring out which ones are needed to understand the whole sentence and where they appear, giving these higher attention scores.

# How a Transformer Works (FT)



But it also uses self-attention, which is when the model looks at all the words in the sentence at the same time, capturing their connections and dependencies. It works out meaning based on context in the sentence.



*match =  
football  
game*



This makes it faster but also better at understanding longer chunks of text compared with earlier models that could only process words sequentially.

*match =  
stick you  
spark*



# How a Transformer Works (FT)

Football game: John's team 2  
(John, Lucy). Pete's team 1 (Amy).  
Venue: Pickering Park. Weather: rainy



*Generate a two-sentence match report*

In a thrilling and rain-soaked football encounter at Pickering Park, John's team emerged victorious with a 2-1 win against Pete's team. John and Lucy displayed outstanding teamwork, overpowering Amy's valiant efforts and securing the hard-fought victory for their side.

## Generating a response

The decoder predicts the next word in the sentence step by step, using what it learnt from the encoder and paying attention to the context of previous generated words to make improved predictions. The more data it is trained on, the better its inferences and predictions are, based on previous patterns.

# AI Use Cases in Taxation

- **Enhanced Taxpayer interaction:** Online [virtual agents](#) in lieu of or augmenting human agents along the taxpayer as customer journey. They answer frequently asked questions (FAQs) around topics or provide personalized advice, cross-referencing types of tax rules or suggesting preliminary answers or recommended steps for users. Here AI augments interaction with taxpayers across websites and social media platforms.
- **Trend spotting, Recommendation engines:** Using past taxpayer behavior data, AI algorithms can help to discover data trends that can be used for audit selection to tax fraud detection e.g. VAT fraud. AI can help taxpayers complete their tax reporting by making relevant add-on recommendations during the process of filling up taxes or filing online e.g. if a married taxpayer filed to elect for certain deductions that is common for that class of taxpayers.
- **Multimodal interaction with taxpayers:** Computer speech recognition or speech-to-text uses natural language processing to process human speech into a written format. This can help taxpayers who are illiterate or speed up interactions with taxpayers e.g. during site audits/interviews. Tax administrations' devices can incorporate speech recognition into their systems to conduct voice search (similar to Alexa or Siri) or provide more accessibility around texting. Computer vision enables computers and systems to derive meaningful information from digital images, videos and other visual inputs, and based on those inputs, it can take action. ChatGPT for example can combine text with audio, images and in the future video. It is the ability to provide recommendations that distinguishes this AI from simple image recognition tasks.

# AI/ML Enhance Audits (Information Systems Audit and Control Association)

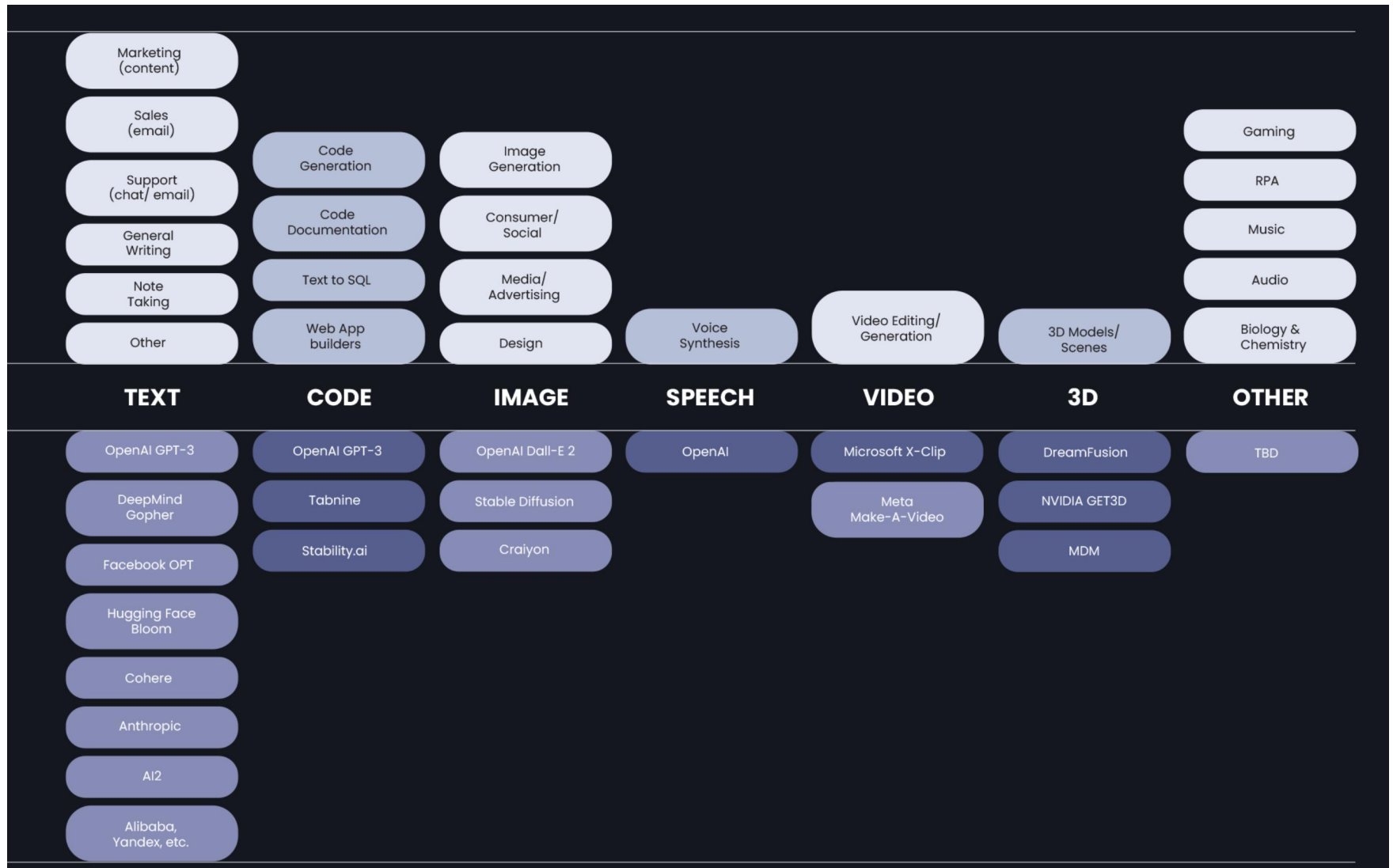
**Figure 3—Suggested AI/ML Techniques for Use in Auditing**

AI or ML Techniques	Application/Use Cases	Usage
Document classification	Application of classification models (e.g., decision trees, Bayesian classifiers, nearest neighbors) to assign documents or text segments to a specific topic or label	<ul style="list-style-type: none"> <li>Understanding SOPs, policies and other deliverables reviewed during auditing</li> <li>Inference from previous similar audit reports</li> </ul>
Text summarization	The process of combining frequently used words, phrases and topics to generate a natural language summary of a text or a document set	<ul style="list-style-type: none"> <li>Helpful to generate audit observations and inferences</li> <li>Auto-generation of audit checklists</li> </ul>
Topic analysis	Analysis performed across documents, groups of documents or document texts to identify unique topics that link documents or sections of documents	<ul style="list-style-type: none"> <li>Data analytics</li> <li>Building keyword rule engine for audits</li> </ul>
Search and retrieval	The process of searching a database or repository of processed information to retrieve documents that align with the topics or themes that are entered in the search criteria	<ul style="list-style-type: none"> <li>Similar audit report inferences</li> </ul>
Statistical analysis	A basic statistical analysis technique that evaluates the term, phrase or topic trends	<ul style="list-style-type: none"> <li>Aggregating data</li> <li>Interpreting data</li> </ul>
Sentiment analysis	The ability to extract and analyze text or groups of text in documents to understand author's sentiment	<ul style="list-style-type: none"> <li>Identifying key issues and risk</li> <li>Intelligent inferences in audit reports</li> </ul>

**Continuous Real time audits:** rather than end of period audits — e.g., fraud detection = immediate action . Assurance about accuracy and reliability of taxpayer's data



# Generative AI Application Landscape



# Language Translation

Meta's M2M-100 trained on 2,200 language directions, No need for English data

好吃！寄给我那个食谱！



oh, c'était tellement amusant ! j'en garde un excellent souvenir, j'ai hate de pouvoir revenir




Just visited the house I grew up in! The new owners even let me see my old bedroom :)




La lune est particulièrement belle ce soir.



Средний ИМТ пациентов уменьшился с 31 до 24.5 за последние пять лет



С нетерпением жду, когда смогу услышать о твоём сюрпризе на день рождения!



Me acaban de dar la mejor sorpresa de cumpleaños!



Help non-English non-French speaking developing countries draft tax legislation or speed up legal references in negotiations?

# Programming, Building websites



Here is an example of a function that calculates the average salary from a pandas DataFrame in Python:

```
import pandas as pd

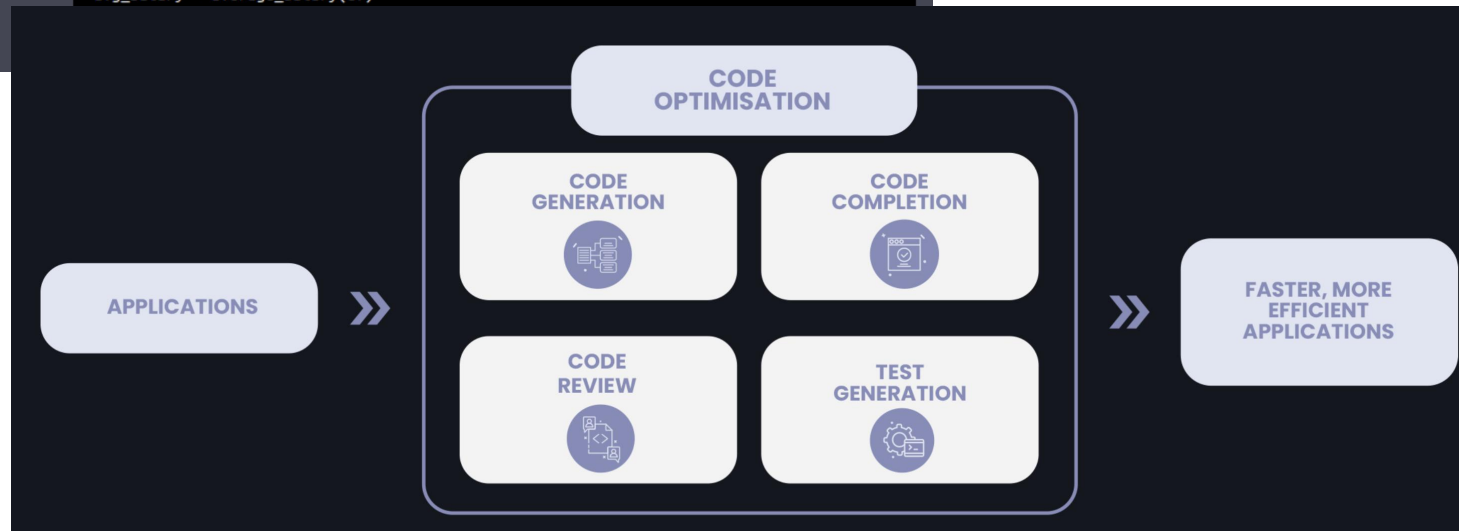
def average_salary(dataframe):
    salary_column = "salary"
    if salary_column in dataframe.columns:
        return dataframe[salary_column].mean()
    else:
        return "Salary column not found in DataFrame."
```

Copy code

You can call the function on a DataFrame like this:

```
df = pd.read_csv("employees.csv")
avg_salary = average_salary(df)
```

Copy code



# Generative AI – Productivity Boost

Table: Survey responses measuring dimensions of developer productivity when using GitHub Copilot

## When using GitHub Copilot...

### Perceived Productivity

I am more productive 88%

### Satisfaction and Well-being

Less frustrated when coding 59%

More fulfilled with my job 60%

Focus on more satisfying work 74%

### Efficiency and Flow

Faster Completion 88%

Faster with repetitive tasks 96%

More in the flow 73%

Less time searching 77%

Less mental effort on repetitive tasks 87%

- » Work of 200 person programming team can now be done by 10
- » Microsoft \$30 co-pilot: summarise, generate presentations using all forms of enterprise data (emails, text, doc, databases etc)





**AI Taxation = Cloud  
Taxation ?**

# ChatGPT 3.5: How to tax Artificial Intelligence?

Taxing artificial intelligence (AI) poses unique challenges due to its diverse applications and potential impact on various industries. As of my last update in September 2021, specific AI taxation frameworks were not widespread. However, here are some considerations and potential approaches that could be explored:

**Profit Taxation:** Taxing AI could be approached by taxing the profits generated by AI-related activities. This approach would apply to companies that develop and sell AI products or services, as well as those that use AI to enhance their operations.

**Transaction Tax:** Governments could impose a transaction tax on AI-related transactions, such as AI software sales, AI technology licenses, or AI consulting services.

**Robotics Tax:** Some have suggested the idea of a "robotics tax," which would be levied on companies using AI-powered robots to replace human labor. The rationale behind this concept is to ensure that the adoption of AI does not lead to widespread job displacement without contributing to the tax revenue.

**Data Taxation:** AI systems often rely on large amounts of data to function effectively. Governments could explore taxing the collection, processing, or use of data by AI systems, particularly in cases where significant data exploitation occurs.

**AI Payroll Tax:** A specific payroll tax could be applied to companies that extensively use AI systems to perform tasks traditionally carried out by human employees. This could help address concerns related to job displacement.

**AI Licensing and Royalties:** Governments could tax the licensing and royalties earned from AI-related patents, technologies, and intellectual property.

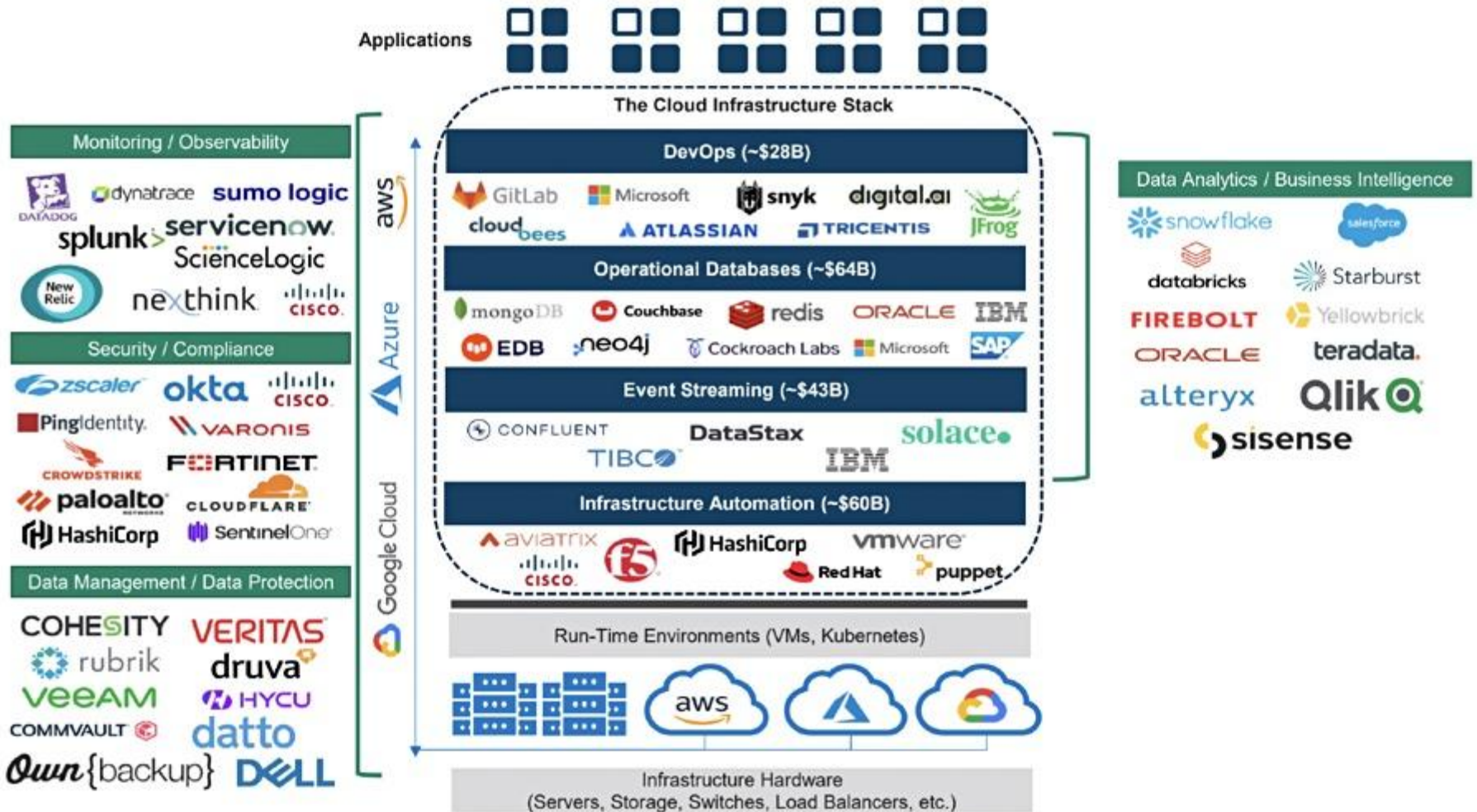
**Research and Development (R&D) Incentives:** Rather than imposing taxes on AI development, governments may offer tax incentives to encourage companies to invest in AI research and development.

**AI Ethical and Compliance Certification Fees:** Governments could introduce fees for companies seeking AI ethical certification or compliance with AI-related regulations to fund oversight and enforcement efforts.

**International Cooperation:** Given the cross-border nature of AI-related activities, international cooperation is essential to prevent double taxation and ensure fair taxation of AI enterprises.



# Example of Cloud Stack

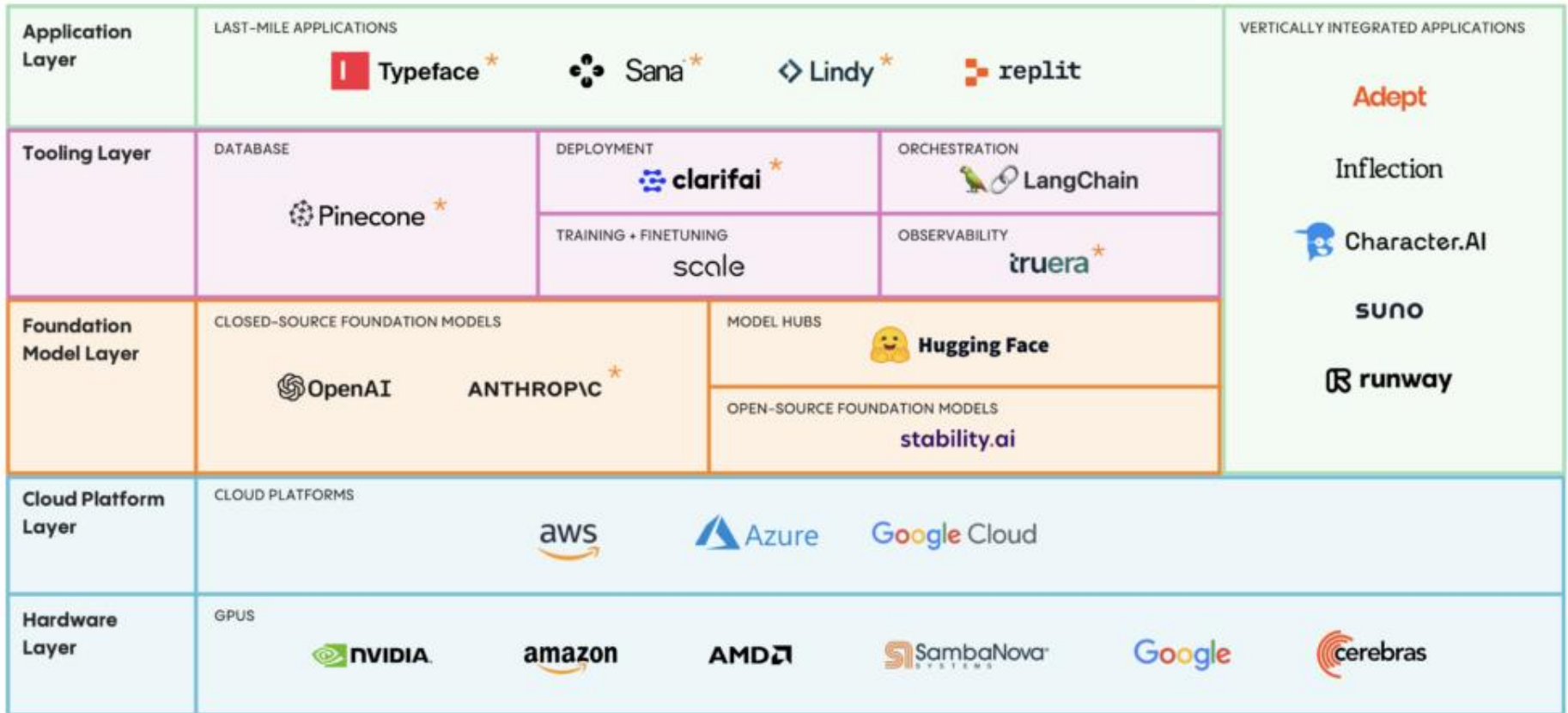


Source: William Blair Equity Research



# Similarity of AI Stack to Cloud Stack

## Foundation Model Stack



# Defining Cloud

“Cloud” is a set of technologies that facilitate remote access to hardware, software, and other computing resources over a network.

National Institute of Standards and Technology (“NIST”) definition of cloud computing:

*Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.*

Essential characteristics of the cloud model:

1. on-demand self-service (the consumer can unilaterally provision computing capabilities without human interaction with the service provider);
2. broad network access (standard networks allow use by a wide variety of client devices);
3. resource pooling (computing resources are pooled to serve multiple consumers using a multi-tenant model, while the customer generally has no control or knowledge over the exact location of the provided resources);
4. rapid elasticity (resources are dynamically assigned, released, and reassigned in response to consumer demand); and
5. measured service (resource use is metered and paid for on an appropriate basis, such as storage, processing, or bandwidth).

# Defining Cloud

According to the NIST Report:

*A cloud infrastructure is the collection of hardware and software that enables the five essential characteristics of cloud computing. The cloud infrastructure can be viewed as containing both a physical layer and an abstraction layer. The physical layer consists of the hardware resources that are necessary to support the cloud services being provided, and typically includes server, storage and network components. The abstraction layer consists of the software deployed across the physical layer, which manifests the essential cloud characteristics.*

# Cloud Business Models

Infrastructure as a Service (“IaaS”): consumer is provided with access to processing, storage, networks, and other fundamental computing resources, but must deploy its own software, which typically includes both operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure, but does control its own operating systems and application software. E.g. data hosting and storage, time-share computing, virtual server instances, network bandwidth, and satellite capacity.

Platform as a Service (“PaaS”) adds to the basic cloud infrastructure a development platform, potentially including programming languages, libraries, services, and other development tools, to allow the consumer to develop and deploy applications in the cloud. The consumer does not manage or control the cloud infrastructure or the development platform, but does control the development and deployment of its own applications. E.g. an operating system, programming languages and libraries, development tools and templates, a database system, and web servers.

Software as a Service (“SaaS”): consumer is provided with access to application software running on the cloud infrastructure. The consumer does not manage or control the underlying cloud infrastructure or the software applications, with the possible exception of limited user-specific application configuration settings. E.g. large enterprise applications, such as CRM, sales automation, and accounting systems, as well as cloud-based desktop application suites, such as Google Apps and Microsoft Office. Closely related to SaaS are services that provide streaming access to digital content other than software, such as video, music, books and other online information services.

Desktops-as-a-Service (“DaaS”) securely delivers virtual apps and desktops from the cloud to any device or location, includes desktop virtualization solution providing secure SaaS and legacy applications as well as full Windows-based virtual desktops and delivers them to the customer. Idea is a simple and predictable pay-as-a-go subscription model, making it easy to scale up or down on-demand.

# Before Cloud

Software regulations (1998) - §1.861-18

## Rights Approach

- » Transactions in a copyright vs Transactions in the subject of the copyright
- » Transfer of a copyright program, whether to related or unrelated persons, may be:
  1. A transfer of a copyright right in the computer program (a copyright right);
  2. A transfer of a copy of the computer program (a copyrighted article);
  3. The provision of services for the development or modification of the computer program; or
  4. The provision of know-how concerning computer programming techniques.
- 5. Transfer of a computer program is a transfer of a copyright right if a person acquires any one or more of:
  6. The right to make copies of the computer program for distribution to the public by sale or other means of transferring ownership, or by rental, lease, or lending;
  7. The right to prepare derivative computer programs based on the copyrighted computer program;
  8. The right to make a public performance of the computer program; or
  9. The right to publicly display the computer program

# Before Cloud

Transfer of a copyright right means, either:

- a. A sale of copyright or
- b. A license generating royalty income.

(A) or (B) depends on whether all substantial rights to the copyright right have been transferred.

Examples:

## **1. License (some but less than total transfer of IP rights)**

A pays B an amount depending on the “number of disks copied and sold”, it is a grant by B to A of a nonexclusive right for a term of years (that is less than the useful life of the software) to a person to make copies of the computer program and distribute them to the public for sale, the transaction constitutes the transfer of a copyright right and will be characterized as a license generating royalties.

## **2. Sale of copyrighted article (No transfer of underlying IP rights)**

A pays B for a copy of the computer program but acquires none of the rights identified earlier (or at least no more than a de minimis amount of those rights), the transfer of the copy of the computer program is classified as a transfer of a copyrighted article.

Generally, a transfer of a computer program (or other digital content under the proposed software regulations) defaults to the transfer of a copyrighted article in the absence of any of the characteristics representing a transfer of a copyright right under the software regulations.

# Before Cloud

## Sale vs Lease

Transfer of a copyrighted article can be classified either

- a. A sale giving rise to gain or loss or
- b. A lease generating rental income.

Sale vs lease depends on whether the benefits and burdens of ownership of the copyrighted article have been transferred. Case law and Section 7701(e) lists the following factors that would indicate the existence of a lease rather than a service contract:

- » the service recipient is in physical possession of the property;
- » the service recipient controls the property;
- » the service recipient has a significant economic or possessory interest in the property;
- » the service provider does not bear any risk of substantially diminished receipts or substantially increased expenditures if there is nonperformance under the contract;
- » the service provider does not use the property concurrently to provide significant services to entities unrelated to the service recipient; and
- » the total contract price does not substantially exceed the rental value of the property for the contract period.



# Before Cloud

## Sale vs Lease

### Example

A corp enters into a distribution agreement with B corp to buy copies of a computer program for sale to retailers from C corp that owns the copyright in the program. The disks containing the program are shipped in boxes enclosed with a shrink-wrap license. Under the framework set forth in the software regulations, the transfer is a purchase of copyrighted articles, regardless of the use of the term “license,” because the buyer acquired individual copies of the program for sale to others. As such, the buyer is treated as an owner of the copyrighted articles, with the result that the transaction is treated as a sale of a copyrighted article.

# [Proposed] Cloud Regulations

9 August 2019 - Proposed regulations (REG-130700-14, Prop. §1.861-19) addressing cloud-based transactions and other transactions involving digital content, such as gaming and social media. Proposed regulations also amend current §1.861-18, which provides rules governing transactions involving computer programs. These proposed rules represent Treasury's first significant attempt to grapple with cloud computing and related digital tax issues.

## Challenge

Unlike usual software transactions, cloud computing transactions are typically characterized by on-demand network access to computing resources, such as networks, servers, storage, and software. Cloud computing transactions ordinarily do not involve a transfer of a copyright right or copyrighted article (or at least a transfer of a right that is considered more than de minimis), as required under § 1.861-18. The software regulations do not provide rules addressing online access to various software programs, servers, or web-based applications — the hallmarks of cloud computing and other digital transactions.

Cloud service recipients and end-users also need clear and administrable guidance given the manner and frequency in which they purchase and access cloud-based services. For example, service recipients and end-users may be concerned about the timing and character of deductible payments, and whether any payments may be subject to withholding.

## Digital Content transfers covered under expanded software regs

Digital content includes “any content in digital format,” such as e-books, movies, and music, provided the content is or was protected by copyright law.

# [Proposed] Cloud Regulations

**Right to public display/performance does not include advertising** under updated software regs

Conveying the right to publicly perform or display digital content for purposes of advertising does not alone constitute the transfer of a copyright right. In these cases, the transaction should generally be viewed as a transfer of a copyrighted article, treated as a sale or lease giving rise to rental income.

**Cloud-based transactions** classified into either one but not both of the following categories:

1. the rendition of services or
2. a lease of property.

Cloud transaction is broadly defined as a “transaction through which a person obtains *non-de minimis* on-demand network access to computer hardware, digital content (as defined in [prop. reg. section] 1.861-18(a)(3)), or other similar resources.”

Proposed cloud computing regulations intended to apply to a wide variety of cloud-based transactions, not only the traditional service models embraced by industry (for example, infrastructure as a service, platform as a service, and software as a service), but also to streaming media, web-based applications, and access to databases, servers, storage, and software.

# [Proposed] Cloud Regulations

## **Bifurcate Cloud -18 vs Software -19**

Older software regs would still apply where software regulations would still govern transactions involving a transfer of software or digital content (for example, downloading of software or other media that is locally stored and available for use on a computer). On the basis that cloud transactions do not involve copyright right transfers, a license giving rise to royalties for the use of intangible property is not among the menu of available classifications.

Bundled arrangements made up of multiple transactions may have different characterizations. No definition of de minimis, instead, words such as “core functionality” and “primary benefit” suggests a less mechanical and fluid standard, more akin to the “predominant character” approach adopted in the subpart F context.

### Examples

A corp provides both data storage and downloading of computer software with access to limited online features, neither of which is de minimis in relation to the other. In that situation, the two transactions are treated independently and, as such, classified separately; the data storage offering is treated as a cloud transaction, while the software download is subject to the software regulations.

A corp offers movies and TV shows with different options — rent, purchase, or streaming — for viewing the content. Although each option permits a consumer to view the same digital content, example in the prop regs confirm that either the software regulations (rent or purchase) or provisions of the proposed cloud computing regulations (streaming) will apply depending on the option chosen by the consumer, resulting in different tax consequences to the provider.

# [Proposed] Cloud Regulations

## Examples

De minimis: A corp provided end-users paid access to an online database. Although end-users were permitted to download (and permanently retain) documents retrieved from the database, the fee paid did not depend on the amount — or content — of materials downloaded, because most of the materials were otherwise publicly available. Rather, the fee end-users pay to the company was attributable to the database’s “look and feel.” The example concludes that in that case, the right to download is *de minimis* in relation to the subscription access to the database, and as such, that function is not treated as a separate transaction. The transaction is thus characterized solely as a service.

# [Proposed] Cloud Regulations

Proposed Regs: Non-exhaustive list of 9 factors demonstrating that a cloud transaction should be classified as a rendition of services rather than a lease of property:

1. the customer is not in physical possession of the property;
2. the customer does not control the property, beyond the customer's network access and use of the property;
3. the provider has the right to determine the specific property used in the cloud transaction and replace that property with comparable property;
4. the property is a component of an integrated operation in which the provider has other responsibilities, including ensuring that the property is maintained and updated;
5. the customer does not have a significant economic or possessory interest in the property;
6. the provider bears any risk of substantially diminished receipts or substantially increased expenditures if there is nonperformance under the contract;
7. the provider uses the property concurrently to provide significant services to entities unrelated to the customer i.e. property used to simultaneously render meaningful services to two or more unrelated customers is highly indicative of a service rather than a lease, especially because in cases of concurrent use, other factors that support classification as a service are likely to be present. E.g. if the data of several unrelated companies were hosted or processed through the same server at the same time, it is hard to believe the transaction could be anything other than a service. However, the prop regs state that even a dedicated server serving a single user would not per se preclude classification of the transaction as a service, if, taking into account all relevant factors, the transaction qualified as a service.
8. the provider's fee is primarily based on a measure of work performed or the level of the customer's use rather than the mere passage of time; and
9. the total contract price substantially exceeds the rental value of the property for the contract period

# [Proposed] Cloud Regulations

Facts and circumstances but generally **tends toward the services characterization** of the transaction. As is common in cloud-computing transactions, the end-user or recipient may only access — but not possess, alter, or control — the database, software, or digital content, or the servers that host the database or software. Even dedicated servers are not leases. Lease transactions appear to be limited to those that supply cloud computing providers, not the cloud computing providers themselves.

## **Sourcing of sale of copyrighted article online – location of download/installation**

A new sourcing rule for sales of a copyrighted article through a digital medium: income from sales of copyrighted articles will be sourced to the location of download or installation onto the end-user's device. In the absence of information on the location of download or installation, sales will be deemed to have occurred at the customer's location (determined based on recorded sales data for business or financial reporting purposes).

Issue with current source rules: “bear little connection to economic reality” in the context of transactions involving digital content because source is determined by the location where rights, title, and interest passed to the buyer and can be easily manipulated.

Impact:

1. End-user is not defined. Prop software source regs also did not address **intermediary** situation (e.g., if Corp. A sells software to Corp. B for further resale. No examples illustrating how the new sourcing rule would apply to transfers of copyrighted articles.



# [Proposed] Cloud Regulations

2. VPN: For a purchase of software or other digital content (for example, a movie or book) through a virtual private network (VPN), it is unclear whether the end-user should be considered the owner or administrator of the VPN, or whether the IRS may (or even should be able to) look through the VPN to the IP address of the ultimate purchaser (even assuming no concerns exist regarding privacy rights or sensitive commercial information).
3. Systems and procedures to track and catalog customer location and with intermediaries, the location of a customer's customers.
4. Potential ECI for Inbound taxpayers (and in some cases controlled foreign corporations) making sales to U.S. customers, especially for taxpayers in non-treaty jurisdictions such as Taiwan and Brazil. Historically, inbound taxpayers navigated the fact-based U.S. trade or business inquiry by ensuring that title passed outside the United States.

Even if an inbound seller has no U.S. presence but does business through a digital exchange (for example, website or app stores) or other intermediary, there is an increased risk that those activities will be imputed to the company, resulting in a U.S. trade or business and taxation of any U.S.-source income on a net basis, not to mention a slew of cumbersome reporting and compliance obligations. Also, for U.S.-parented foreign subsidiaries selling into the United States, CFCs must consider, and monitor, the risk of generating U.S.-source global intangible low-taxed income, which could result in excess foreign tax credits in the GILTI basket.

5. Some uncertainty as to application of section 863(b) to sales of copyrighted articles through an electronic medium, when the copyrighted article is “produced” entirely or in part in the US or abroad.

# [Proposed] Cloud Regulations

As amended by the TCJA, section 863(b) provides that income from the sale of inventory that is either:

- a. produced (in whole or in part) inside the US and then sold or exchanged outside the US or;
- b. produced (in whole or part) outside the US and then sold or exchanged inside the US is allocated and apportioned solely on the basis of the location of production activity.

To ascertain the potential application of section 863(b) to sales of software, software vendors must first determine whether software-development-related activities qualify as production. Section 864(a) broadly defines produce to include “created, fabricated, manufactured, extracted, processed, cured, or aged.” Given the breadth of this definition, one could reasonably argue that coding or software design constitutes the creation of a copyrighted article. Nevertheless, this construct is consistent with now-repealed section 199, which generally provided that software development constituted qualifying production property for purposes of the domestic production activity deduction.

Second, even if section 863(b) were to apply, software vendors must still resolve whether, for sales of copyrighted articles (for example, computer software) that a seller produces or is treated as producing, section 863(b) trumps the new sourcing rule in prop. reg. section 1.861-18(f)(2)(ii), because the proposed software regulations would no longer source sales of copyrighted articles under the traditional title passage rule. Prop. reg. section 1.861-7(c), which sets forth the general title passage rule for sales of inventory, refers taxpayers to prop. reg. section 1.861-18(f)(2)(ii) to determine the source of income from the sale of copyrighted articles.

# [Proposed] Cloud Regulations

Further, although prop. reg. section 1.861-18(f)(2)(ii) provides that income from sales of copyrighted articles will be sourced, in relevant part, under section 863 “as appropriate,” the regulation as drafted seems to restrict those statutory provisions to sales of copyrighted articles other than those that are sold and transferred through an electronic medium. One reading of the proposed sourcing rule, which preserves section 863(b), is that it should not apply to sales of computer software that the seller itself produces and sells through an electronic medium. And although Treasury does not elaborate, it would seem inappropriate for the proposed sourcing regulation to override a statutory provision that on its face would seem to squarely apply.

## **Sourcing of income generated by cloud computing transactions and other digital content**

General sourcing rule for services found in sections 861(a)(3) and 862(a)(3) (place of performance). Case law (*Piedras Negras*) and other guidance (LTR 6203055590A) point to the location of employees and tangible assets of the service provider. Activities of related (subject to ALP) or unrelated parties (at least absent certain agency arrangements) are not imputed to a taxpayer generally.

## Future Challenges

1. OECD’s Automated Digital Services under Pillar 1 sourcing rules.
2. Artificial intelligence and the internet of things, automated digital services with limited/no employee involvement where the controlling factor is customer location (consistent with the foreign-derived intangible income provisions), location of research and development or intangible property, or even formulary apportionment.

# [Proposed] Cloud Regulations

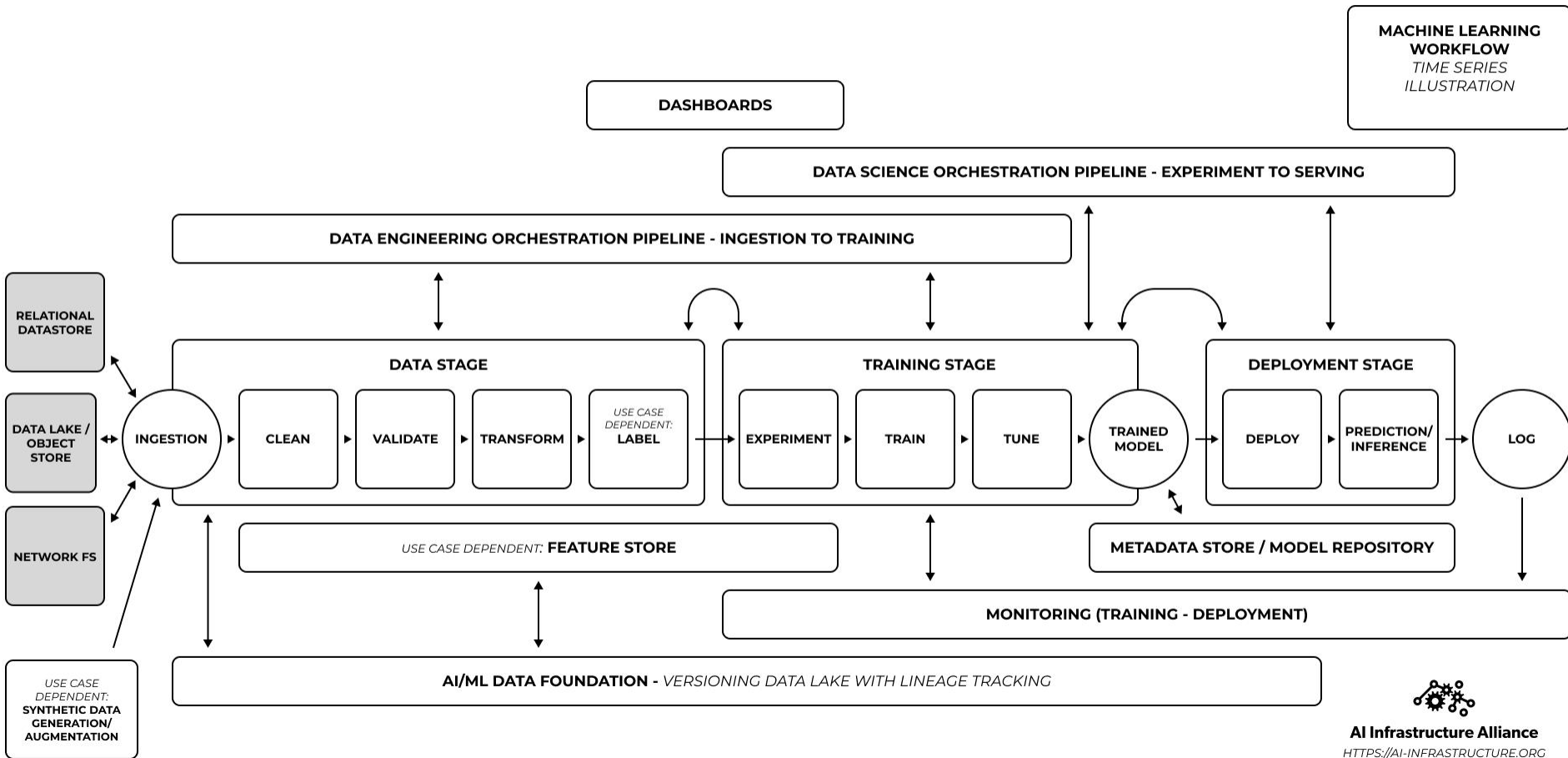
## Relevance of Ongoing Internet Access on whether there is a transfer

Transfer of a computer program or other digital content remains a precondition to applying the software regs, the prop cloud computing regs bifurcates between functionality (or lack thereof) of the program or application when used offline versus online.

The examples in the proposed cloud computing regulations indicate that the focus for evaluating whether there has been a transfer depends on whether internet access is necessary for full functionality of the program or application.

<b>Online access affords no or limited Increased functionality</b>	<b>Online access provides a significant increase in, or is required for, functionality</b>
Software regs	Prop Cloud regs
E.g. Sale of a computer program that is intended for use on the purchaser's internal network. the computer program is purchased under a subscription agreement, and the seller provides annual updates free of charge. On-demand access to the seller's network is not included or necessary for the purchaser to effectively use the program. As a result, the transaction is treated as a transfer of digital content and governed by the software regulations, not the proposed cloud computing regulations	E.g. The value of the transferred software is largely, if not entirely, a function of the user's ability to access the seller's network through the internet. Although there is technically a transfer of software, the prop regs example concludes that the transfer is de minimis and should be disregarded in determining the overriding nature of the transaction. As a result, the transaction is governed by the provisions of the cloud computing rules and classified as a service.

# Detailed AI, Machine Learning Workflow



**AI Infrastructure Alliance**  
[HTTPS://AI-INFRASTRUCTURE.ORG](https://ai-infrastructure.org)

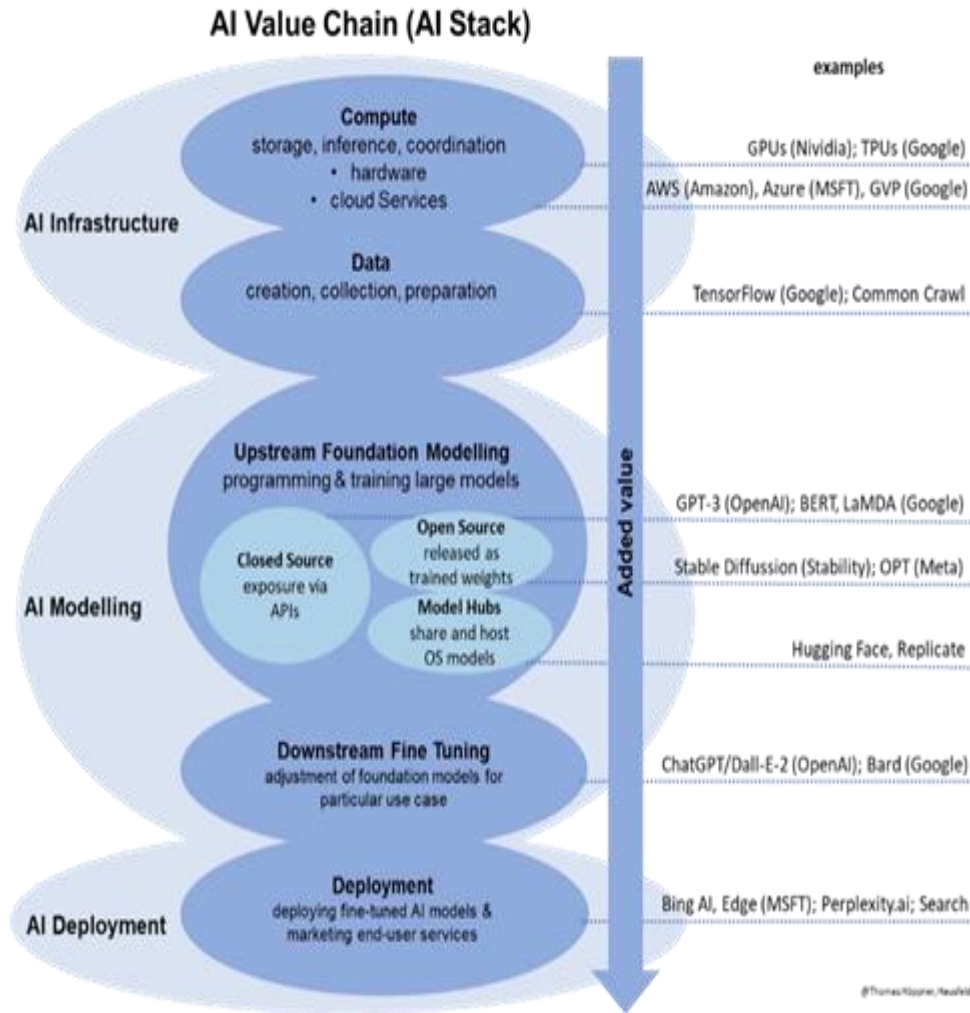
# Stages of Machine Learning & AI Stack

- » **1. Data creation & collection:** Any machine learning requires the creation and collection of some raw data. Since almost all data are created by people and/or about people, data can be gathered through different tools, stretching from Internet crawl to the scanning of proprietary data bases. Once data are collected, they are stored and secured in data centers. In the early days, companies stored their data in their own brick-and-mortar data centers. But data storage is increasingly shifting to the cloud, where companies access their data through the internet from cloud service providers.
- » **2. Data curation:** Generated data needs to be prepared and curated into suitable datasets. This involves the effort to convert, clean, enhance, format, and label (created and stored) raw data to make it consistent and usable.
- » **3. Training of foundation models:** The celebrated centerpiece in the recent rise of AI is the training of a foundation model with the curated datasets. As with all machine learning, such training involves the configuration of an algorithm to make any relevant predictions from the data.

# Stages of Machine Learning & AI Stack

- » 4. **Adaptation** (fine-tuning): While particularly powerful, foundation models are intermediary assets; they are generally not used directly but require an adaptation for specific downstream tasks. Such adaptation centers on the so-called fine-tuning that adjusts foundation models to perform specific tasks of interest. Beyond that, adaptation may also involve alleviating deficiencies of stand-alone foundations models, for instance, to make them legally compliant.
- » 5. **Deployment**: Once a fine-tuned AI model has been developed, it needs to be turned into a commercially viable product or service that is deployed by people. This task is typically carried out by software programmers or app developers that bring the fine-tuned models to life. Often the value chain does not end but actually starts here: entrepreneurs first identify a commercially promising business case for a product or service.

# AI Value Chain



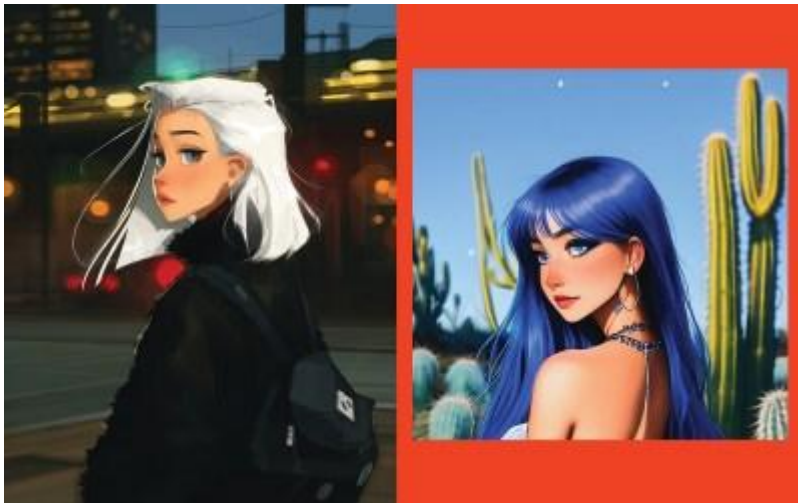
- » Where are the DEMPE functions?
- » When and where is IP created?
- » Contributed Pre-existing IP? Does it include data?
- » Remote Cloud Server, programmers?
- » AI as a service or a tool or an IP?



# Issues with AI

# Copyright

- » March 15, 2023: U.S. Copyright Office announced that works created with the assistance of artificial intelligence (AI) may be copyrightable, provided the work involves sufficient human authorship. *Copyright Registration Guidance: Works Containing Material Generated by Artificial Intelligence, 88 Fed. Reg. 16,190* i.e. works created by AI without human intervention or involvement still cannot be copyrighted
- » Hollywood actors and writers strike against studios who want imagine & voice replicas free forever
- » Artists suing Midjourney and Stability AI for AI image generators trained by scraping billions of images from the internet, including countless works by digital artists who never gave their consent.



Left: night scene with Kara, 2021, Sam Yang;  
Right: Samdoesarts v2: Model 8/8, Prompt:  
pretty blue-haired woman in a field of a cacti at  
night beneath vivid stars (wide angle), highly  
detailed.

# Regulating AI – EU example

AI Categories	Examples	Approach to regulation
Unacceptable risk	<ul style="list-style-type: none"><li>• Social scoring that classifies people based on behaviour, socio-economic status or personal traits</li><li>• Real-time and remote biometric identification, such as facial recognition</li><li>• Manipulative systems, such as voice-activated toys that encourage children to act dangerously</li></ul>	<ul style="list-style-type: none"><li>• Banned with only some exceptions</li><li>• Remote biometric identification after a “significant delay” may be allowed to prosecute serious crimes, with court approval</li></ul>
Minimal or no risk	<ul style="list-style-type: none"><li>• AI-enabled video games</li><li>• Spam filters</li><li>• Majority of AI systems currently used in the EU fall into this category</li></ul>	<ul style="list-style-type: none"><li>• Can be used freely</li></ul>
Limited risk	<ul style="list-style-type: none"><li>• Chatbots</li><li>• AI systems that generate or manipulate image, audio or video content, such as deepfakes</li></ul>	<ul style="list-style-type: none"><li>• Users should be made aware that they are interacting with a machine, so they can decide whether to continue</li></ul>

# Regulating AI – EU example

AI Categories	Examples	Approach to regulation
High risk	<ul style="list-style-type: none"> <li>• AI systems that are used in products under the EU's product safety legislation, such as toys, cars and medical devices</li> <li>• AI systems falling into eight specific areas:               <ul style="list-style-type: none"> <li>- Biometric identification of people</li> <li>- Operation of critical infrastructure</li> <li>- Education and vocational training</li> <li>- Employment, worker management and access to self-employment</li> <li>- Access to essential private and public services</li> <li>- Law enforcement</li> <li>- Migration, asylum and border control management</li> <li>- Assistance in legal interpretation and application of the law</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• AI systems will be assessed before being put on the market and throughout their lifecycle</li> <li>• Systems in the eight areas will have to be registered in an EU database</li> </ul>
Generative AI	<ul style="list-style-type: none"> <li>• Technology underpinning tools like ChatGPT, Midjourney</li> </ul>	<ul style="list-style-type: none"> <li>• Companies required to disclose that the content was generated by AI</li> <li>• Model must be designed to prevent it from generating illegal content</li> <li>• Summaries of copyrighted data used for training must be published</li> </ul>

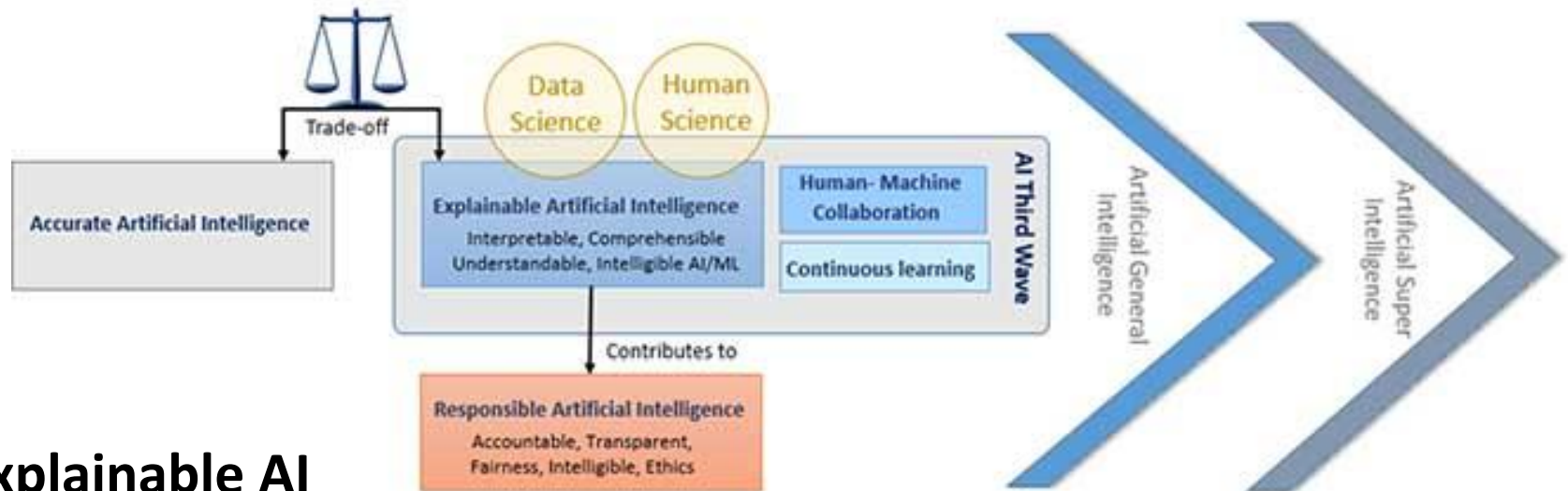
# Regulating AI

- » Values dependent? Facial recognition = unacceptable risk
- » Combined with Data Privacy: General Data Protection Regulation (GDPR) 2018
- » Extra-territorial effect: non-EU companies developing AI systems for the EU market or where an AI system developed by a non-EU company is used to make a decision about an EU resident
- » Lack of uniformity:
  - » Association of Southeast Asian Nations (Asean) working towards guidelines on responsible AI use in 2024
  - » Singapore and Thailand - voluntary frameworks for the industry.
  - » Philippines trade and industry department is pushing for an AI ethics and governance framework
  - » US: As of Jun 23, no comprehensive federal legislation dedicated solely to AI regulation. But existing laws and regulations touch upon certain aspects of AI, such as privacy, security and anti-discrimination
  - » Canada's Directive on Automated Decision-Making

# AI & Taxpayer's Rights

**AI Hallucination:** Large language model (LLM) generates false information

e.g. Ask GenAI to give 5 examples of bicycles models that fit into car when only 3 €



## Explainable AI

-trust/accountability issues with “black box”?

e.g. biased training/data can result in discriminatory AI tax target selection

## Regulating AI – Other issues

Fairness, equity and balance of power (need public and private institutions in protecting taxpayer data and rights?)

- a. Will tax authorities with presumably larger resources and more talent overwhelm taxpayers with AI enabled audits?
- b. What role can Public and private institutions play in drawing up and enforcing a taxpayers' bill of rights?
- c. Should there be a tax Ombudsman to police against bias use of AI or unwarranted audits triggered by false positives
- d. Can an international institution like the World bank and United Nations play a role in ensuring Global South has equitable access to AI in an era that is increasingly moving towards cross-border and global taxation?
- e. Will there be sufficient AI provision as a public good? Cloud infrastructure dominated by a few giants

Sustainability – high energy and financial costs to adopt