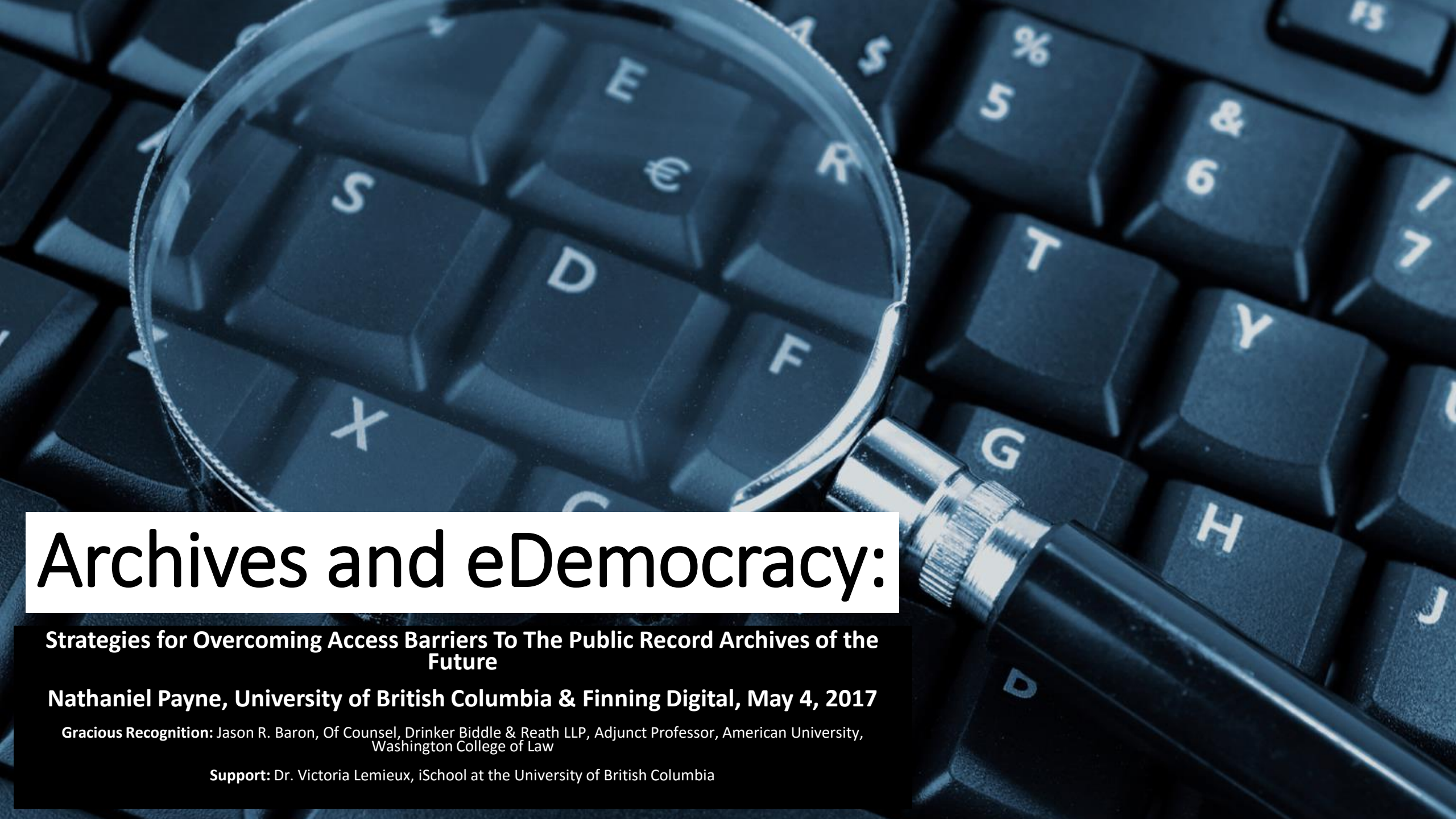


Archives and eDemocracy:

Strategies for Overcoming Access Barriers To The Public Record Archives of the Future

Nathaniel Payne, University of British Columbia & Finning Digital, May 4, 2017

Gracious Recognition: Jason R. Baron, Of Counsel, Drinker Biddle & Reath LLP, Adjunct Professor, American University, Washington College of Law

Support: Dr. Victoria Lemieux, iSchool at the University of British Columbia

Governments increasingly recognize the importance of access to information for enhancing democratic engagement, building confidence in government institutions and strengthening their credibility and effectiveness

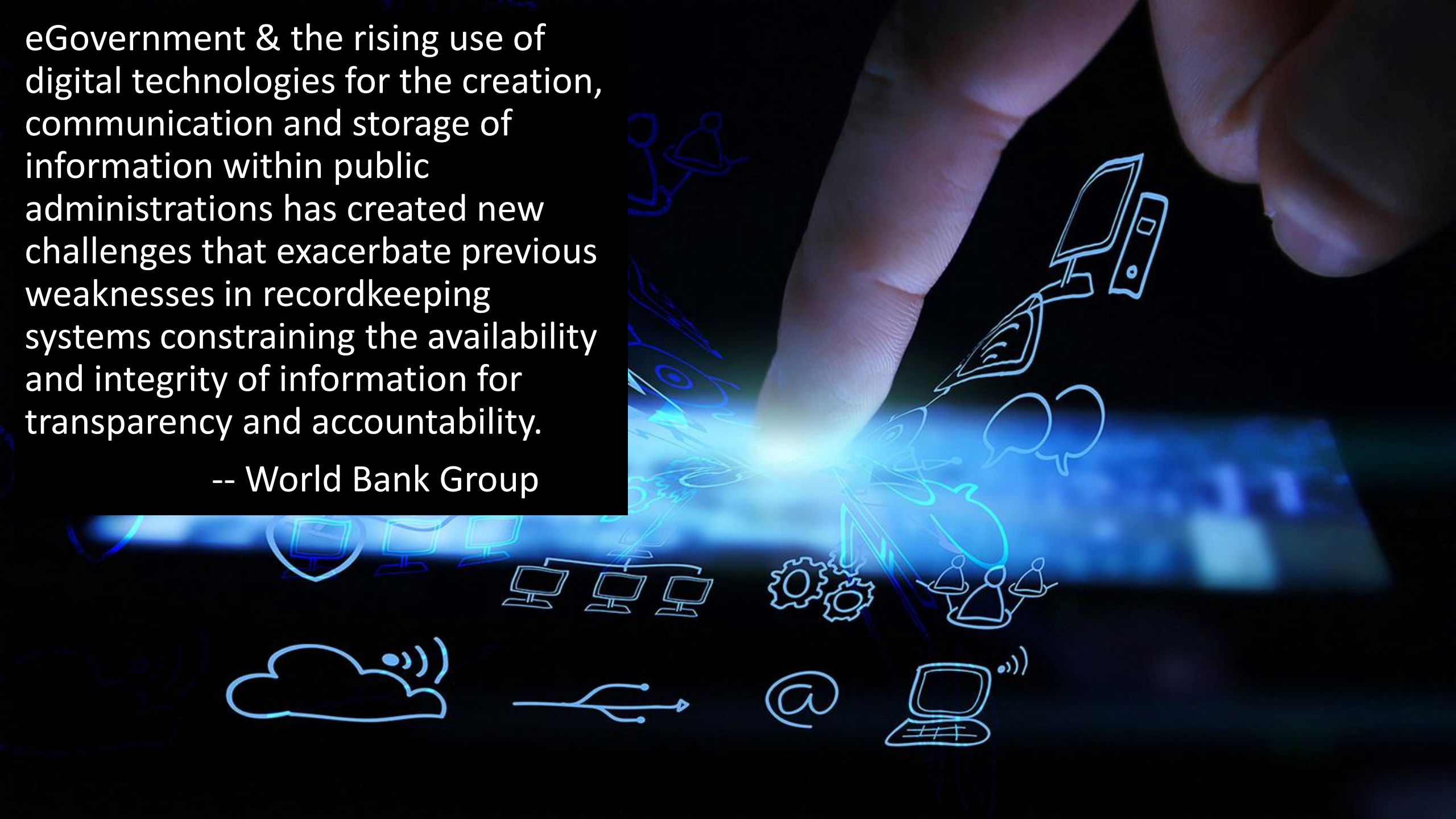
-- United Nations Development Programme

Despite this, eDiscovery is now clearly under siege …

Access to the e-records of 21st century governmental institutions stored in public archives is in danger of being severely restricted.

eGovernment & the rising use of digital technologies for the creation, communication and storage of information within public administrations has created new challenges that exacerbate previous weaknesses in recordkeeping systems constraining the availability and integrity of information for transparency and accountability.

-- World Bank Group

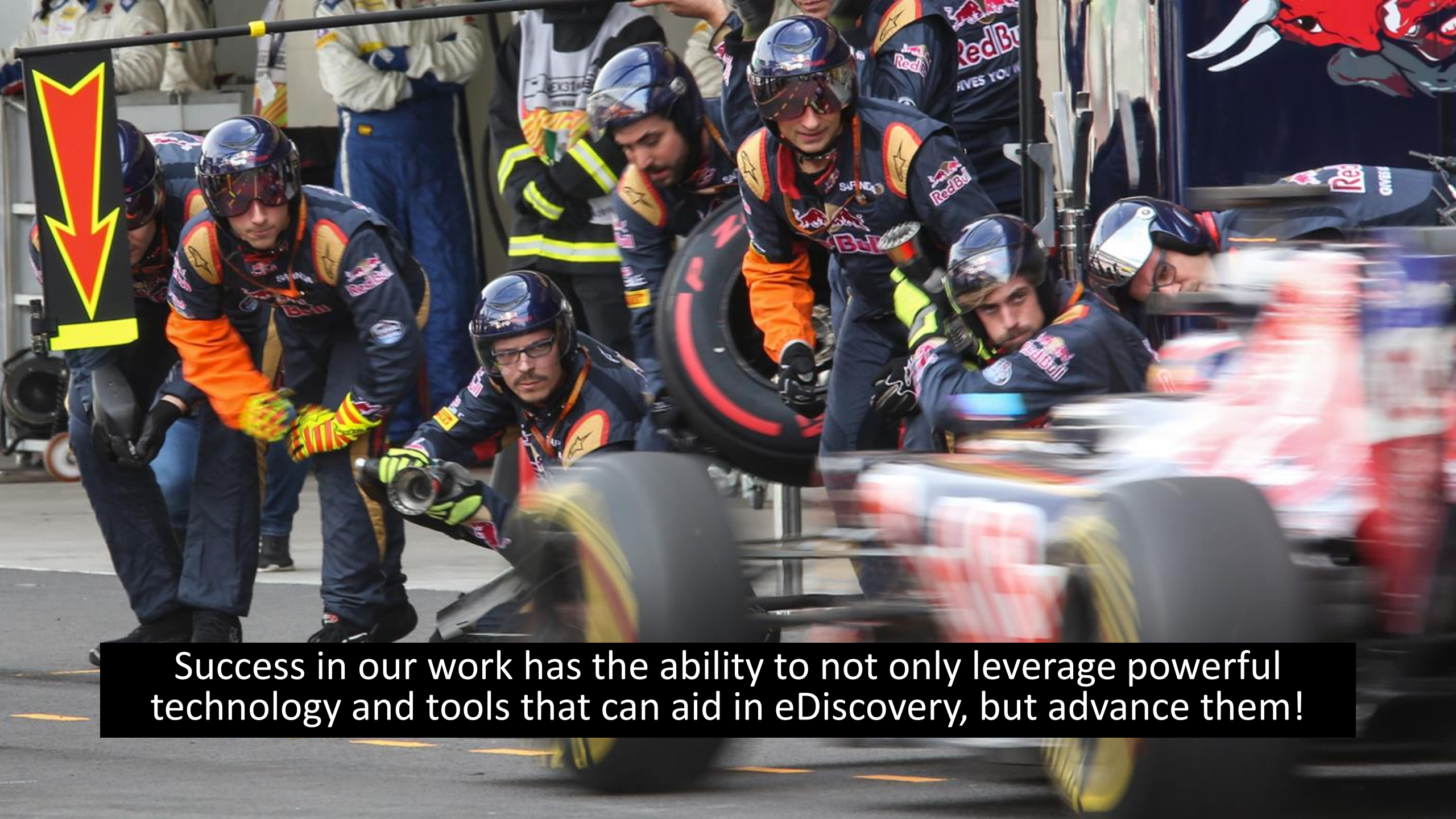


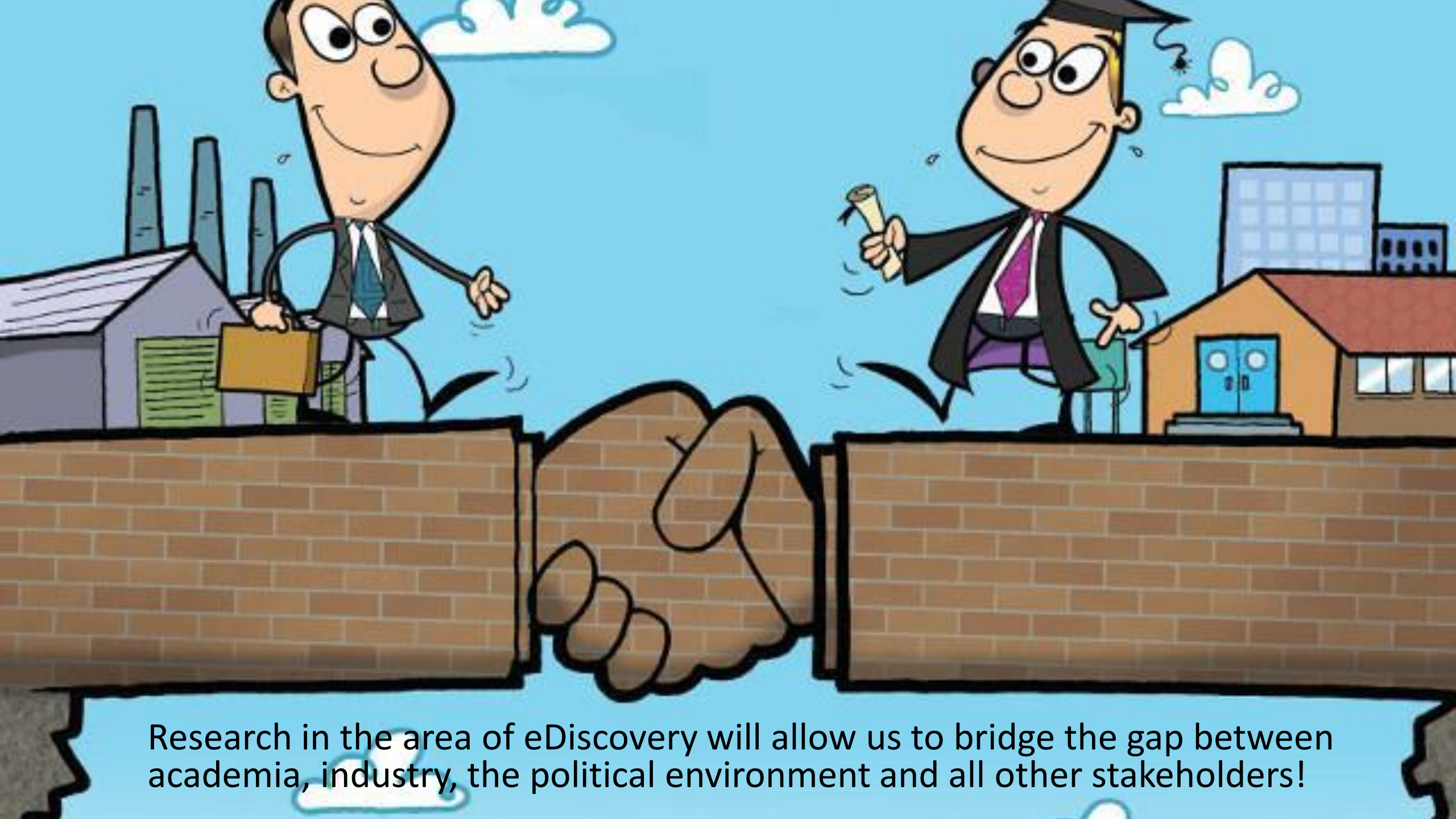

The threat to transparency posed by a failure to think strategically about how to manage and provide citizen access to future vast archival collections of public records containing sensitive data is a serious and important topic, worthy of elevation to and much more extended discussion within various international forums devoted to open data and open government!

Why We Believe This Work Is Important?

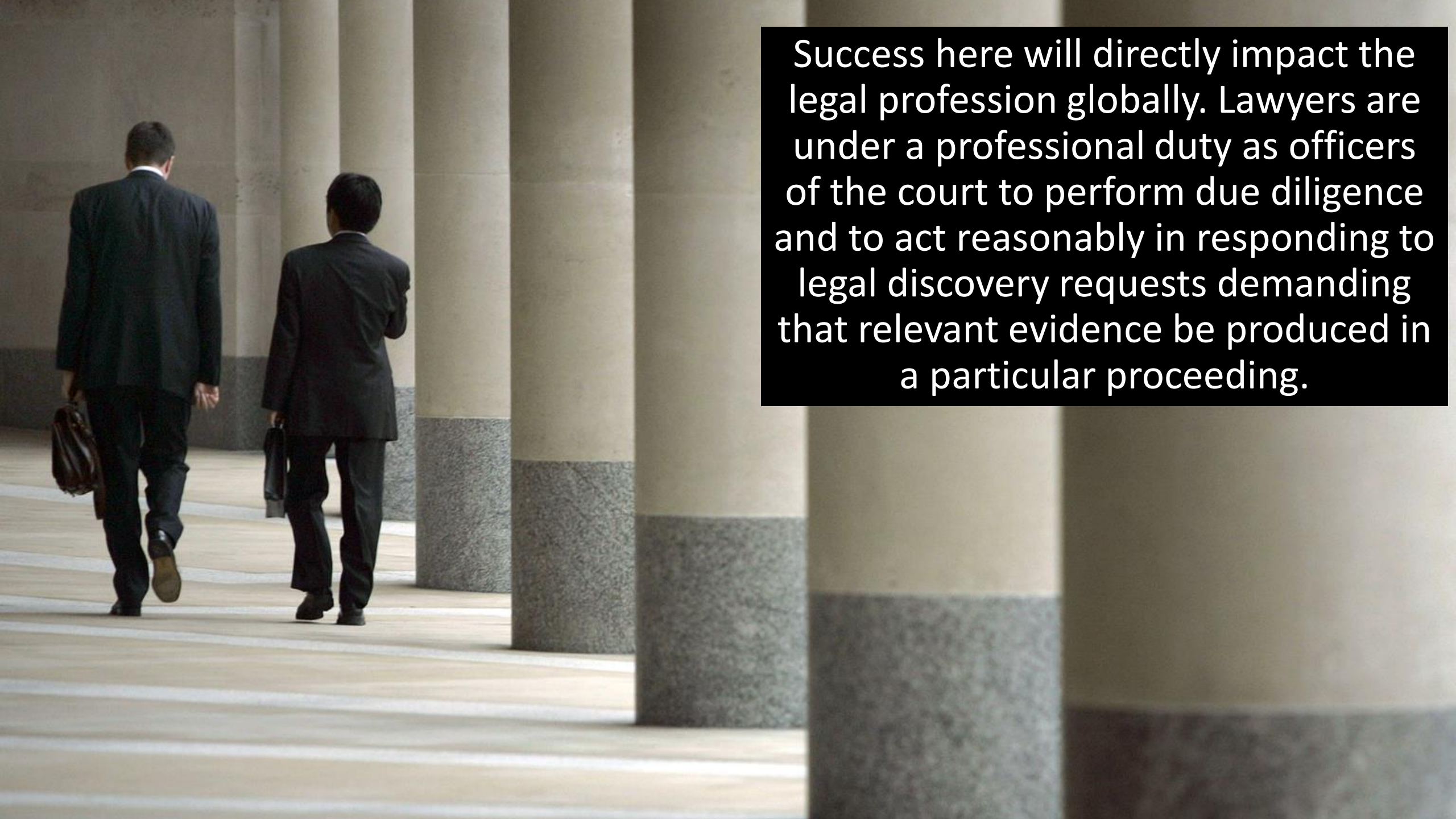
As a business leader, transparency and information sharing builds trust in information and in decision making!

The preservation of records and information is critically important from the perspective of information provenance

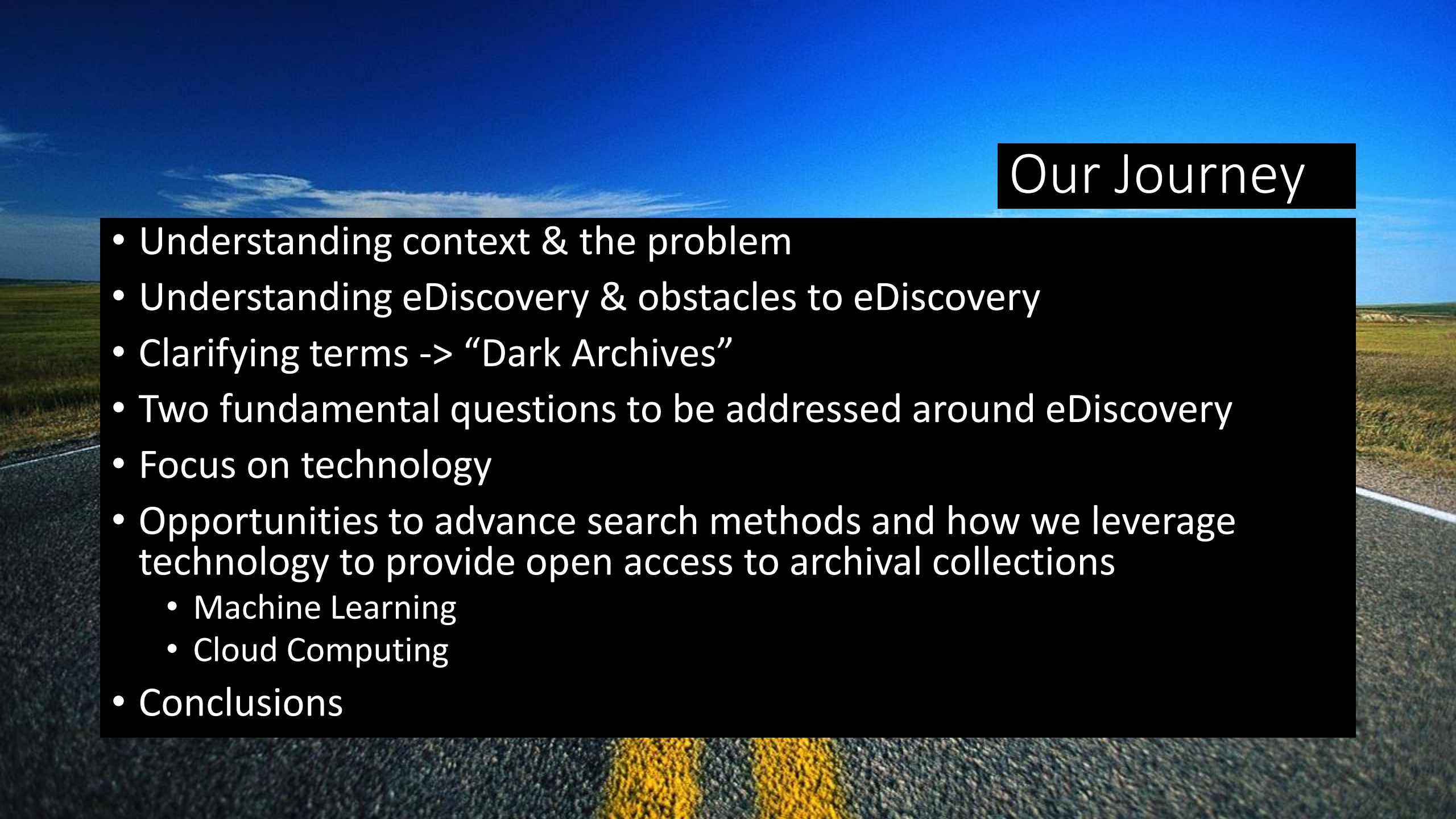

Success in our work has the ability to not only leverage powerful technology and tools that can aid in eDiscovery, but advance them!



Research in the area of eDiscovery will allow us to bridge the gap between academia, industry, the political environment and all other stakeholders!



Success here will directly impact the legal profession globally. Lawyers are under a professional duty as officers of the court to perform due diligence and to act reasonably in responding to legal discovery requests demanding that relevant evidence be produced in a particular proceeding.



Our Journey

- Understanding context & the problem
- Understanding eDiscovery & obstacles to eDiscovery
- Clarifying terms -> “Dark Archives”
- Two fundamental questions to be addressed around eDiscovery
- Focus on technology
- Opportunities to advance search methods and how we leverage technology to provide open access to archival collections
  - Machine Learning
  - Cloud Computing
- Conclusions


What Is eDiscovery?

Electronic discovery (also **e-discovery** or **ediscovery**) refers to discovery in legal proceedings such as litigation, government investigations, or Freedom of Information Act requests, where the information sought is in electronic format (often referred to as electronically stored information or ESI)


E-discovery consists of preserving, searching, and producing to the opposing party or to the tribunal all relevant electronically stored information (ESI) in a particular legal proceeding.

Although perfection is not required, lawyers are under a professional duty as officers of the court to perform due diligence and to act reasonably in responding to legal discovery requests demanding that relevant evidence be produced in a particular proceeding.

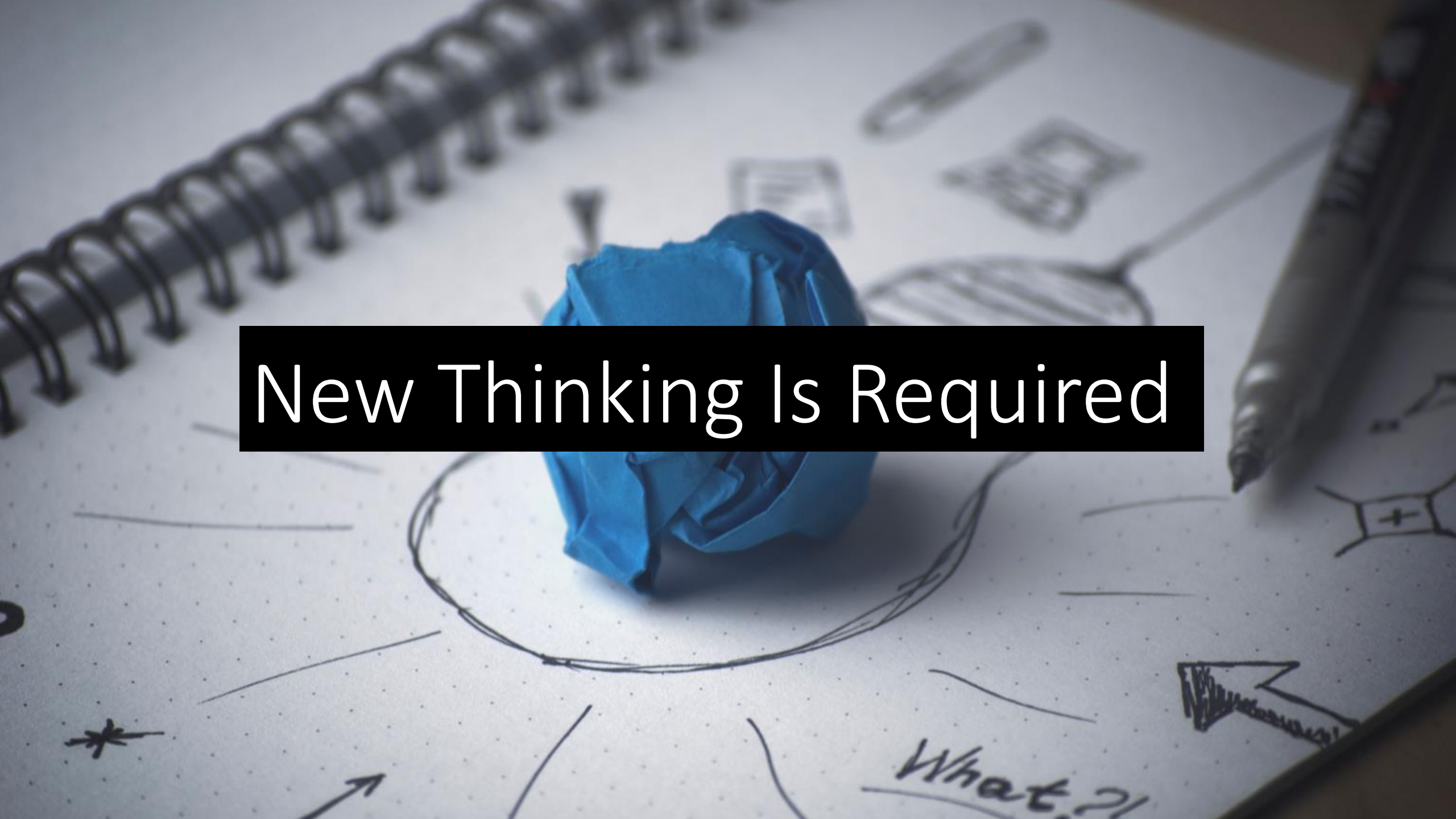
What Are The Obstacles To Successful eDiscovery In The Future?

Obstacle 1

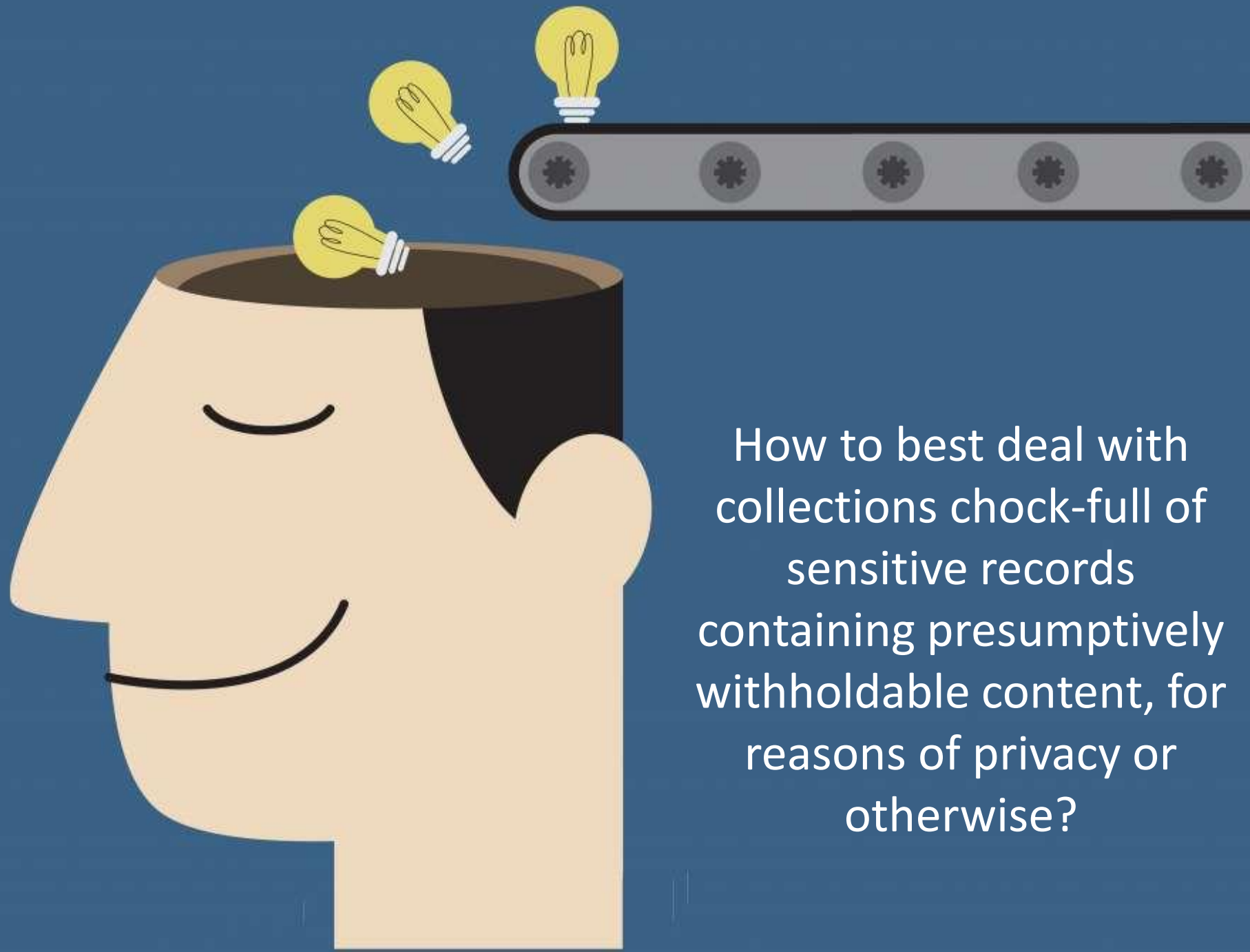
The capture of an exponentially growing universe of records, especially in the form of e-mail and other more state-of-the-art means of communications, coupled with …

Obstacle 2

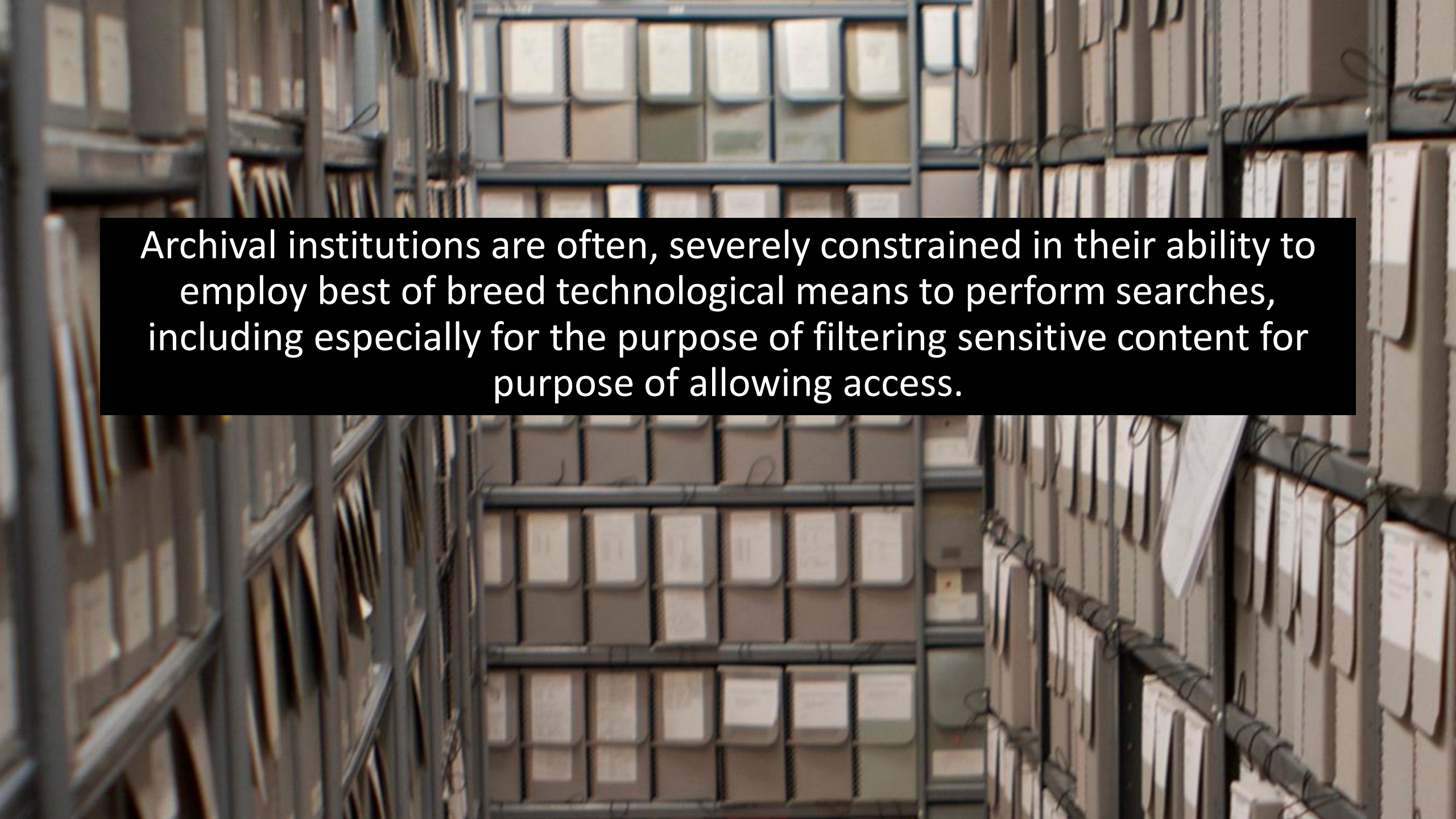
An ever-increasing amount of “sensitive” record content that has the effect of blocking citizen access to *any* records in digital archive repositories.


New Thinking Is Required

How to go about opening collections that cannot in any meaningful way be manually searched?



How to best deal with collections chock-full of sensitive records containing presumptively withholdable content, for reasons of privacy or otherwise?

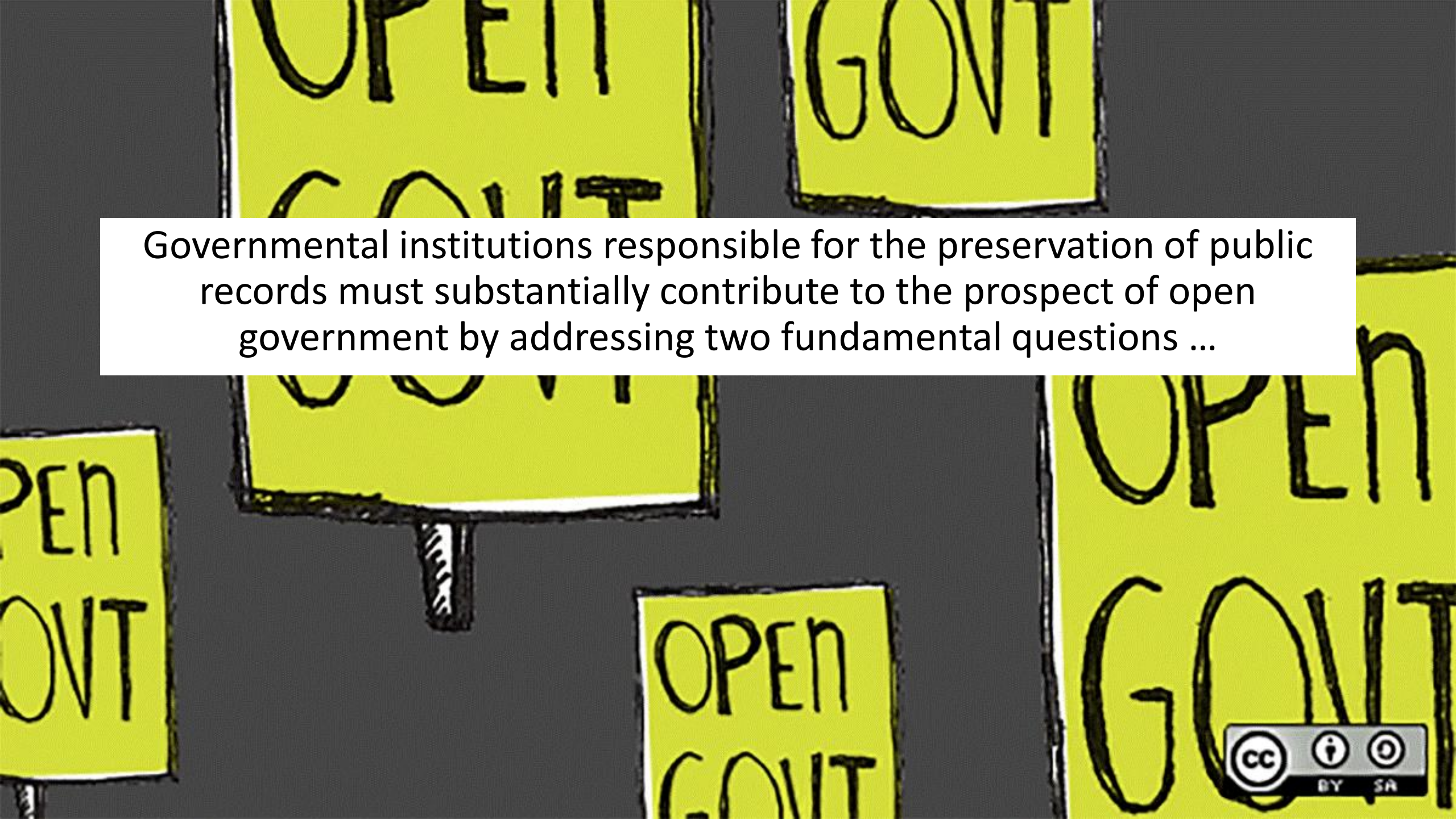

Archival institutions are often, severely constrained in their ability to employ best of breed technological means to perform searches, including especially for the purpose of filtering sensitive content for purpose of allowing access.

As A Result Dark Archives Are Being Created

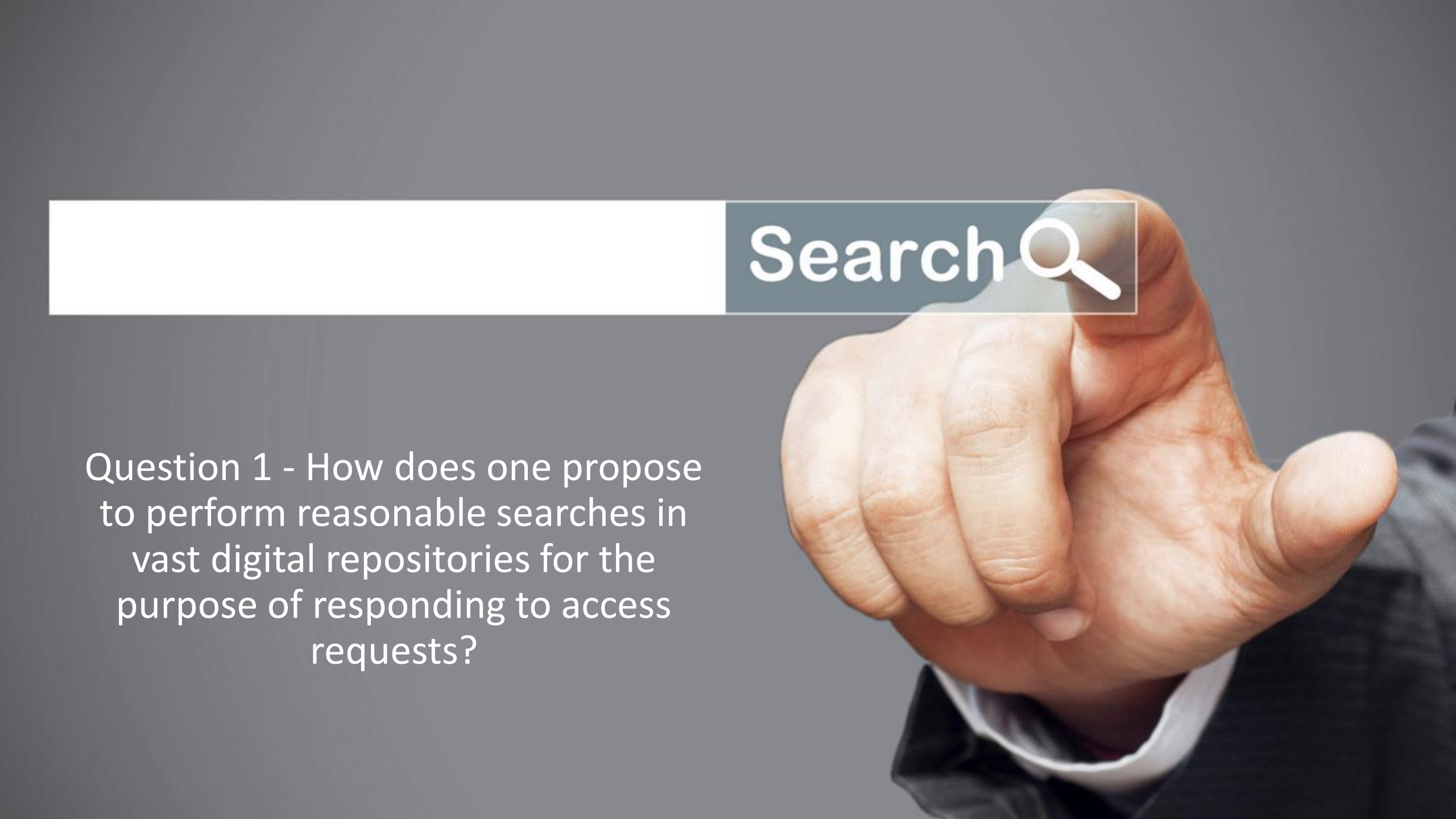
Vast collections of digital records are in danger of being rendered effectively inaccessible (hence the term, “dark archives”).

Given institutional inability to provide any kind of meaningful citizen access within the lifetime of present-day requestors, the growth of dark archives poses a looming public policy challenge largely absent to date from serious discussions of openness and transparency in eDemocracy.

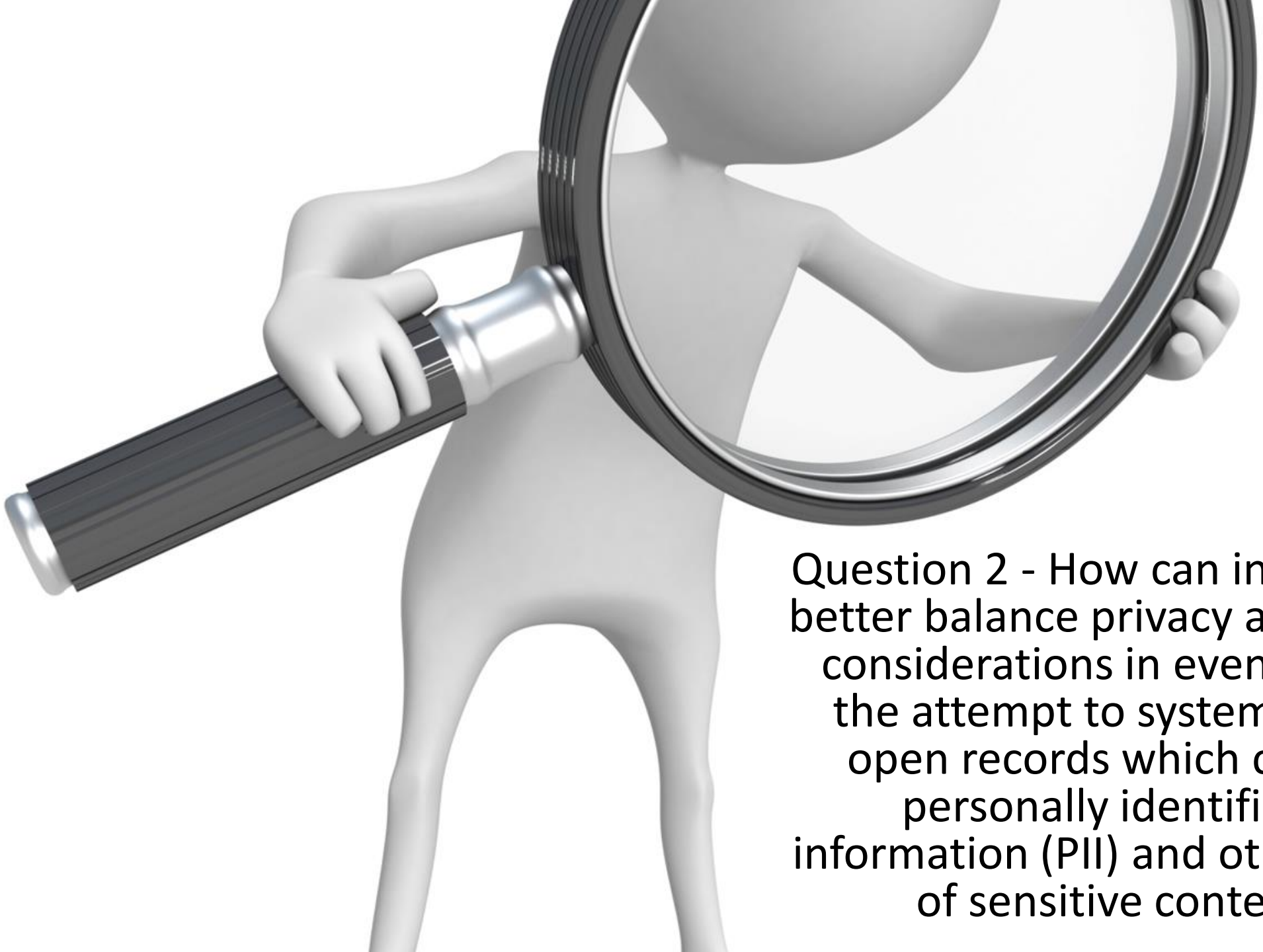
How Do We Address These Challenges?



Governmental institutions responsible for the preservation of public records must substantially contribute to the prospect of open government by addressing two fundamental questions …



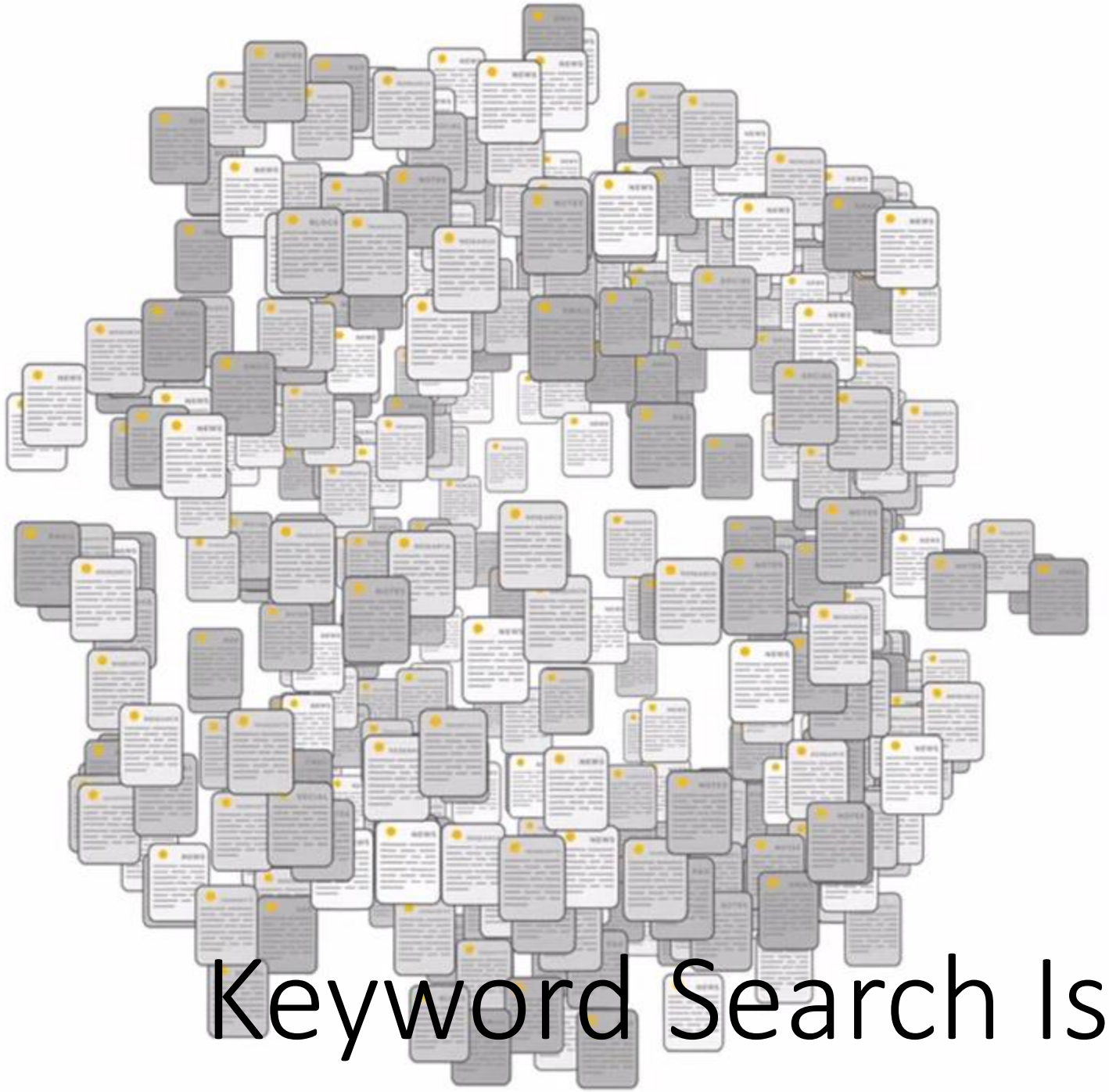
Question 1 - How does one propose to perform reasonable searches in vast digital repositories for the purpose of responding to access requests?



Question 2 - How can institutions better balance privacy and access considerations in even making the attempt to systematically open records which contain personally identifiable information (PII) and other forms of sensitive content?

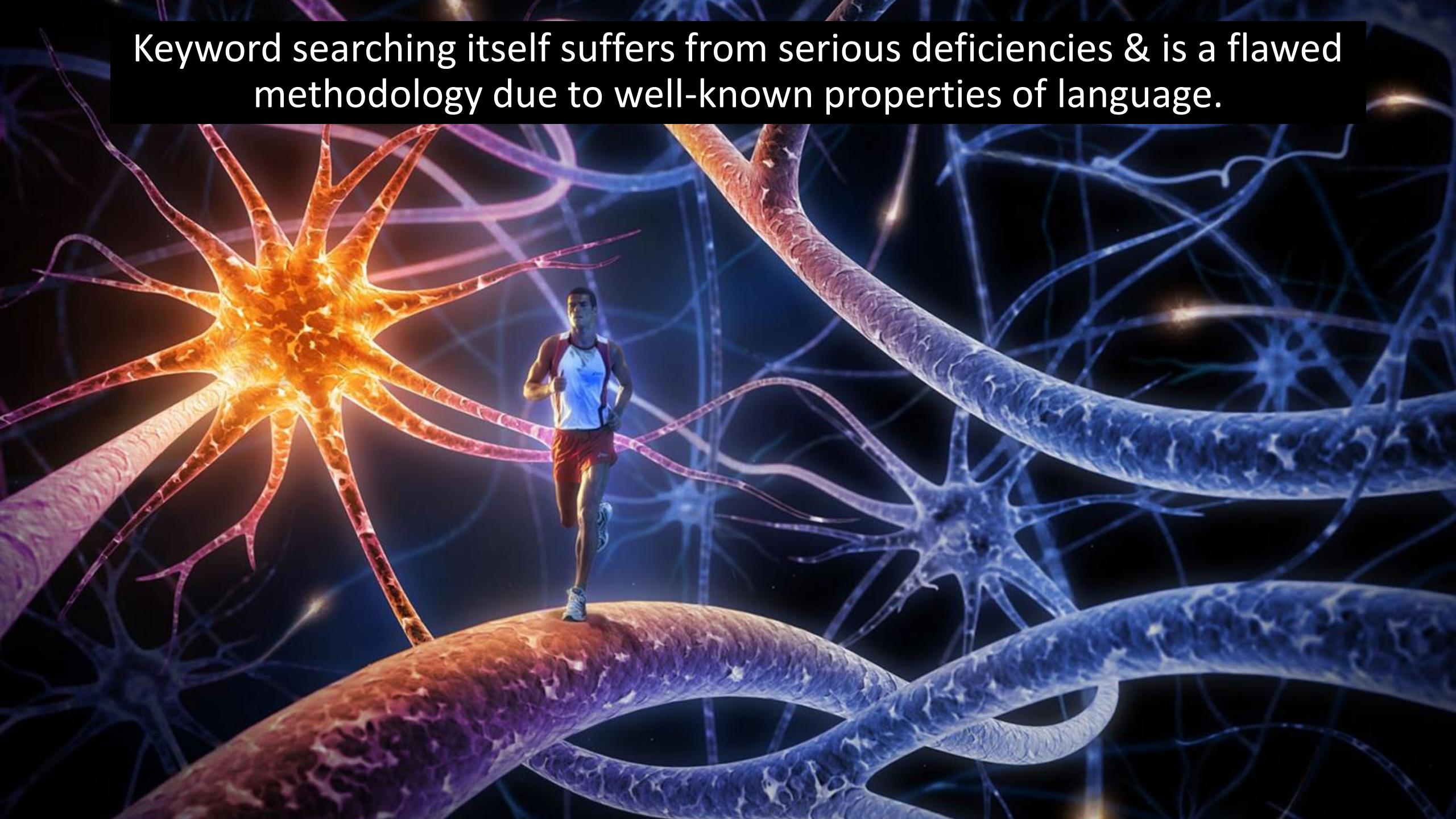
Let’s Consider The First Question – Search

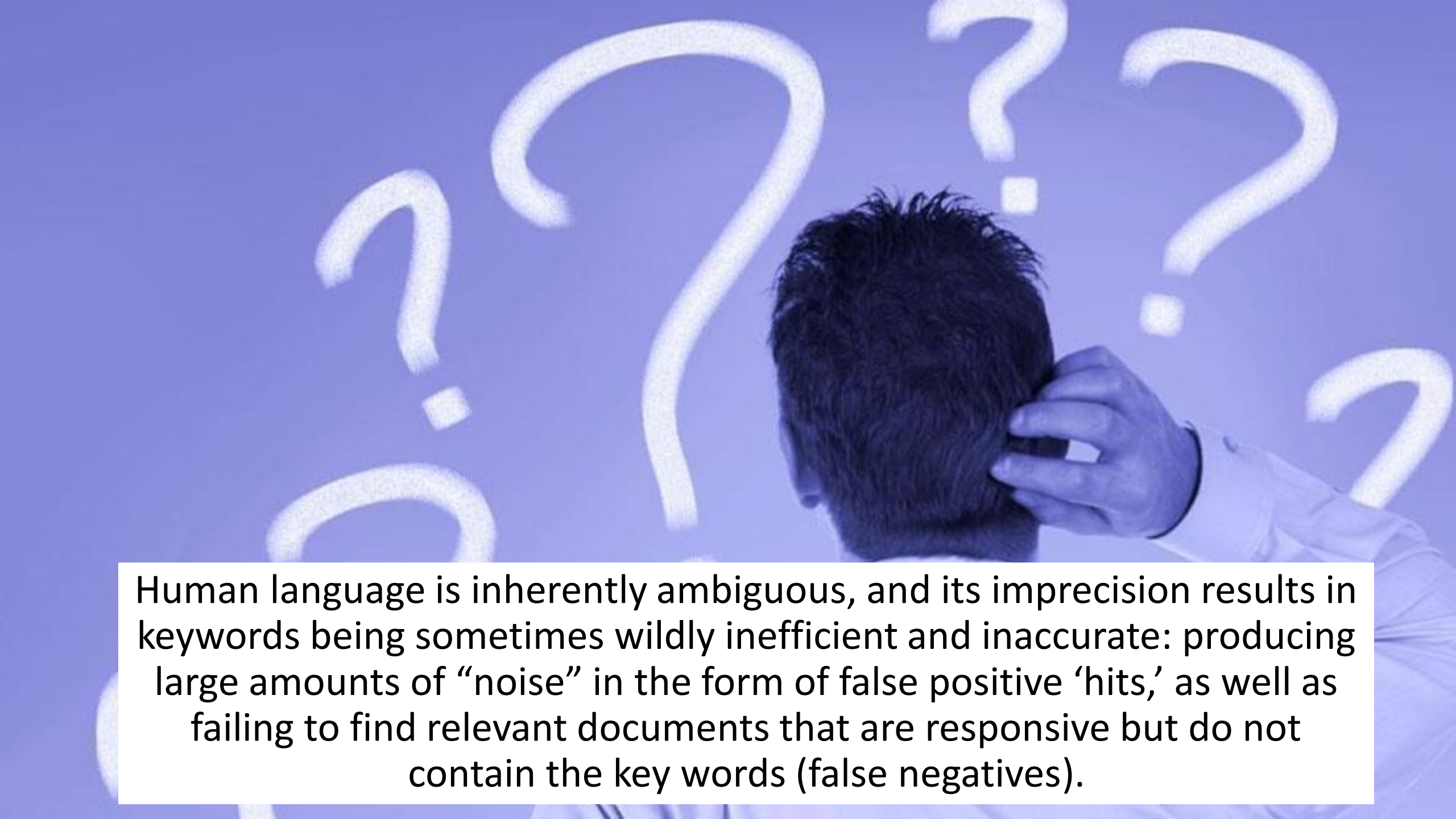
- Over the past decade and a half, the profound limitations of manual and keyword searching have become known to lawyers engaged in “e-discovery” (also known as “e-disclosure”).
- More advanced search methods are needed to provide future access to archival collections



Keyword Search Is Challenging

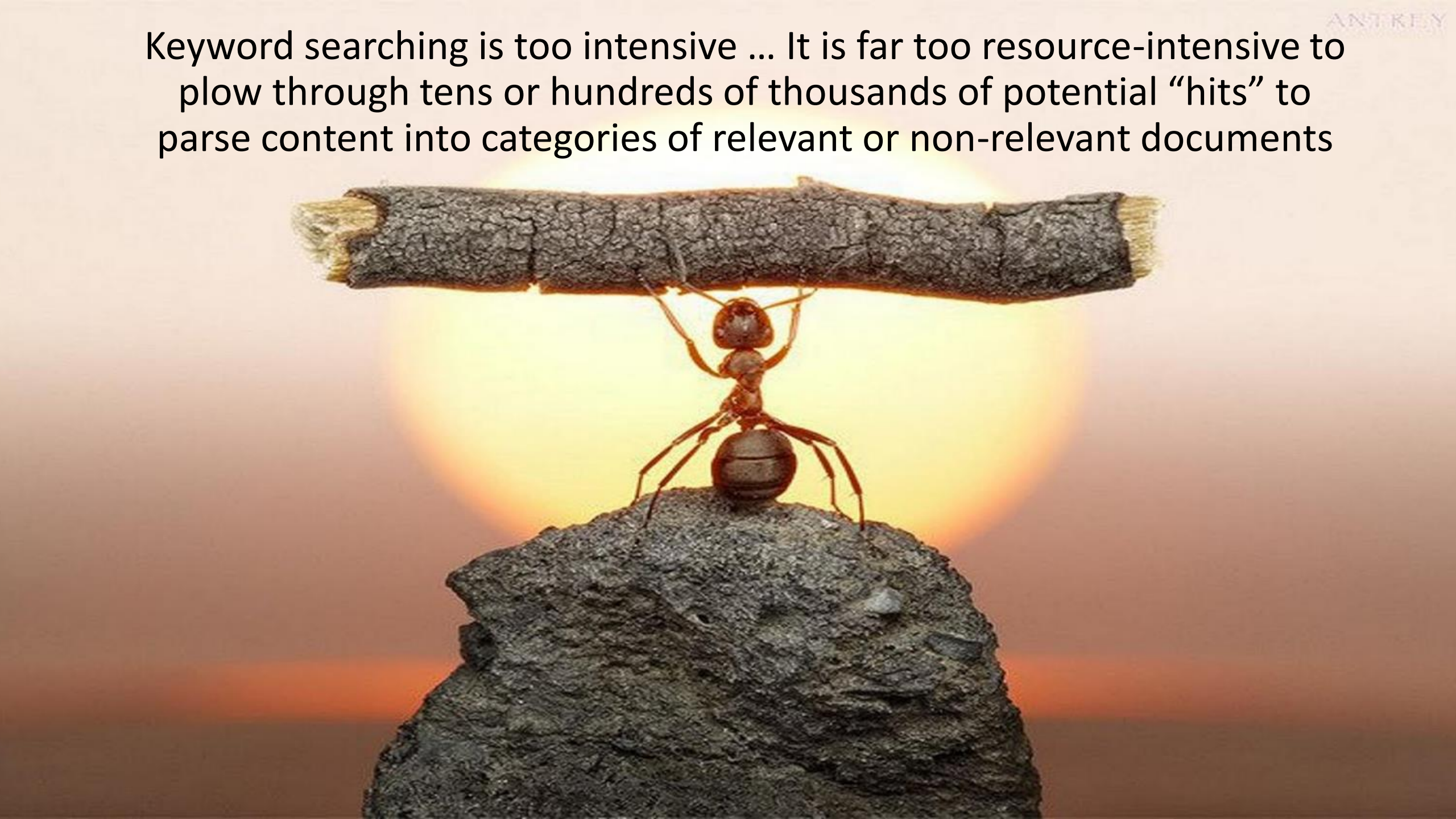
Keyword searching itself suffers from serious deficiencies & is a flawed methodology due to well-known properties of language.





Human language is inherently ambiguous, and its imprecision results in keywords being sometimes wildly inefficient and inaccurate: producing large amounts of “noise” in the form of false positive ‘hits,’ as well as failing to find relevant documents that are responsive but do not contain the key words (false negatives).

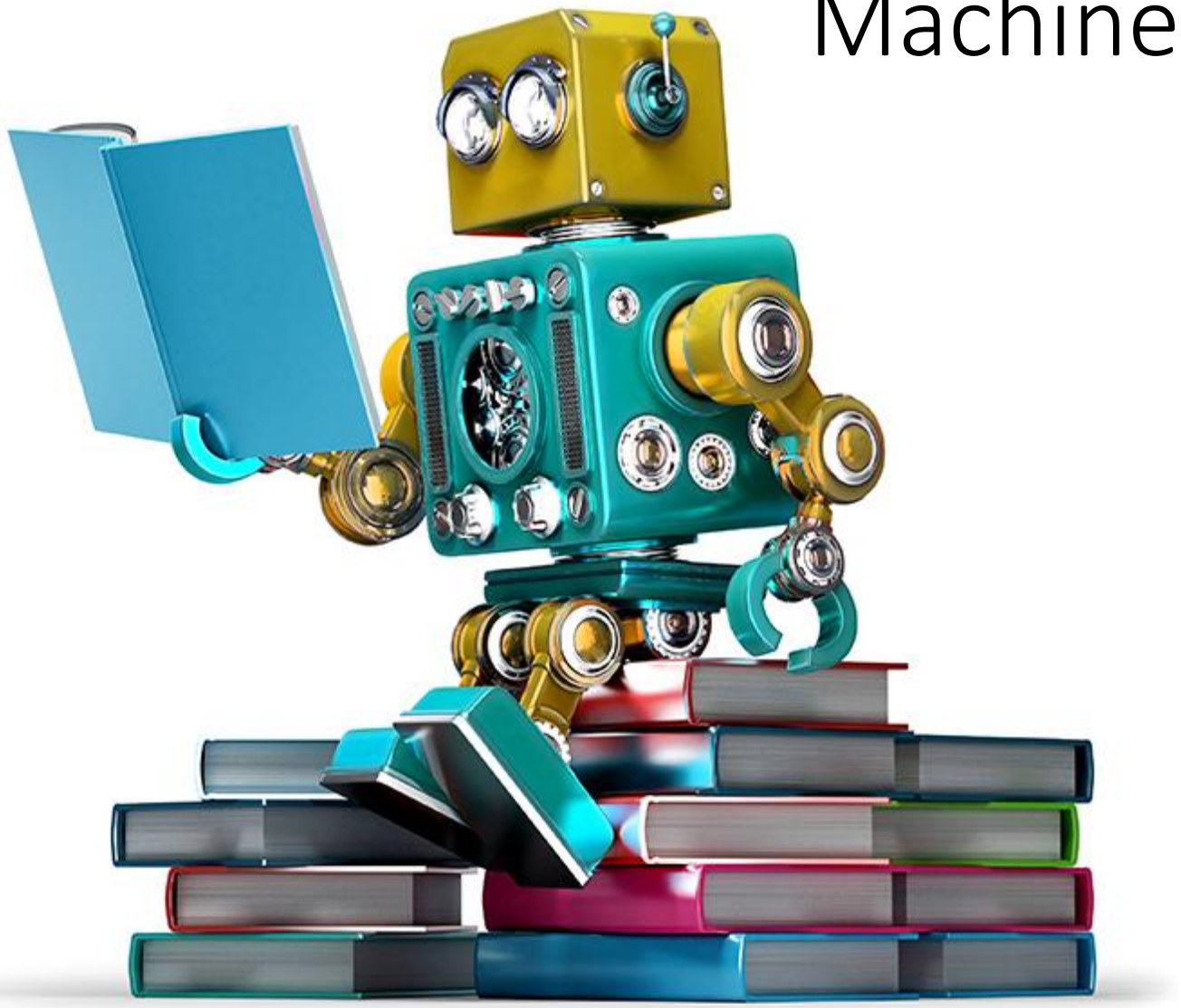
Keyword searching is too intensive … It is far too resource-intensive to plow through tens or hundreds of thousands of potential “hits” to parse content into categories of relevant or non-relevant documents



Advancement 1 – Machine Learning

Machine learning is a method of data analysis that automates analytical model building.

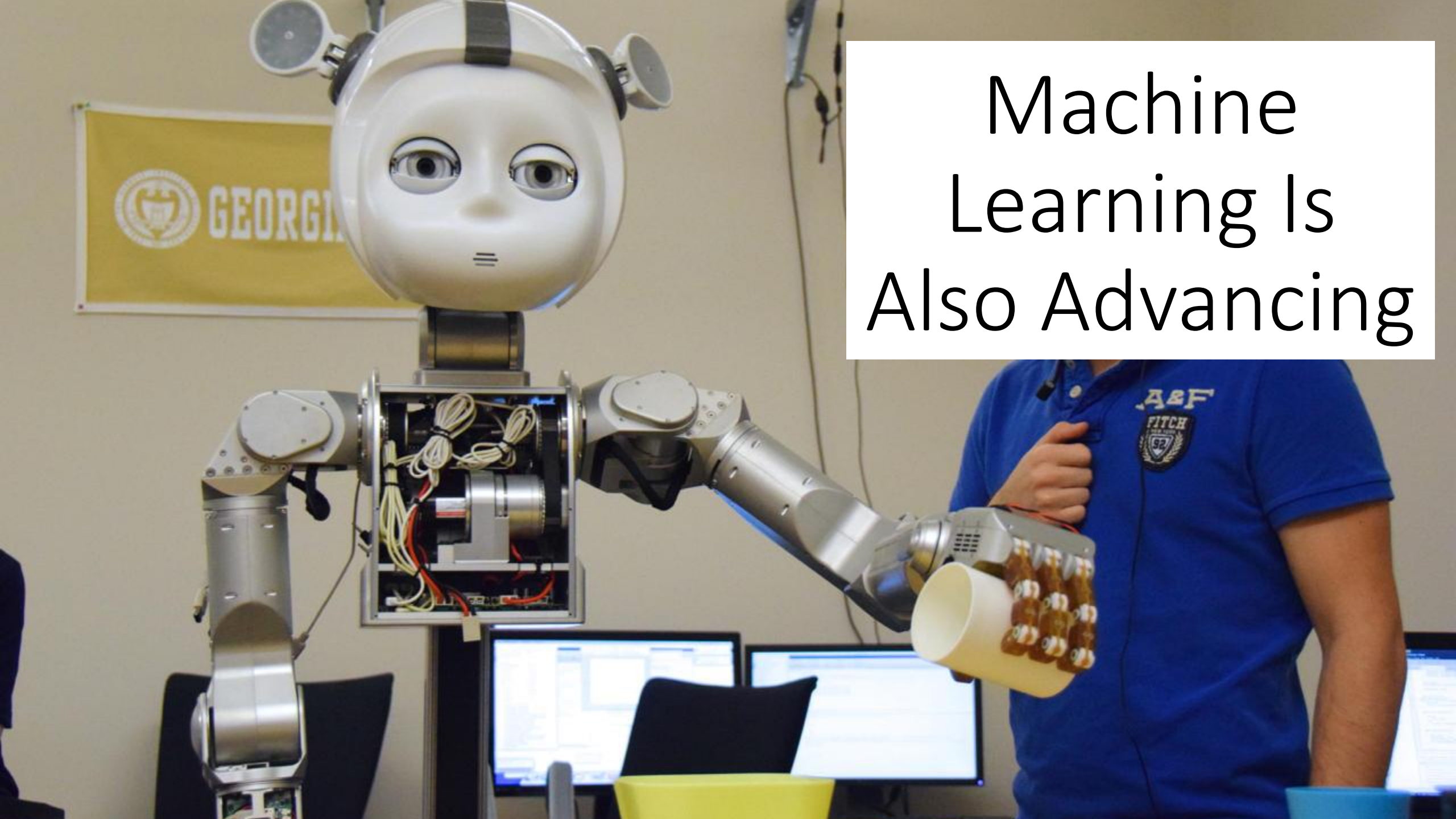
Using algorithms that iteratively learn from data, **machine learning** allows computers to find hidden insights without being explicitly programmed where to look.



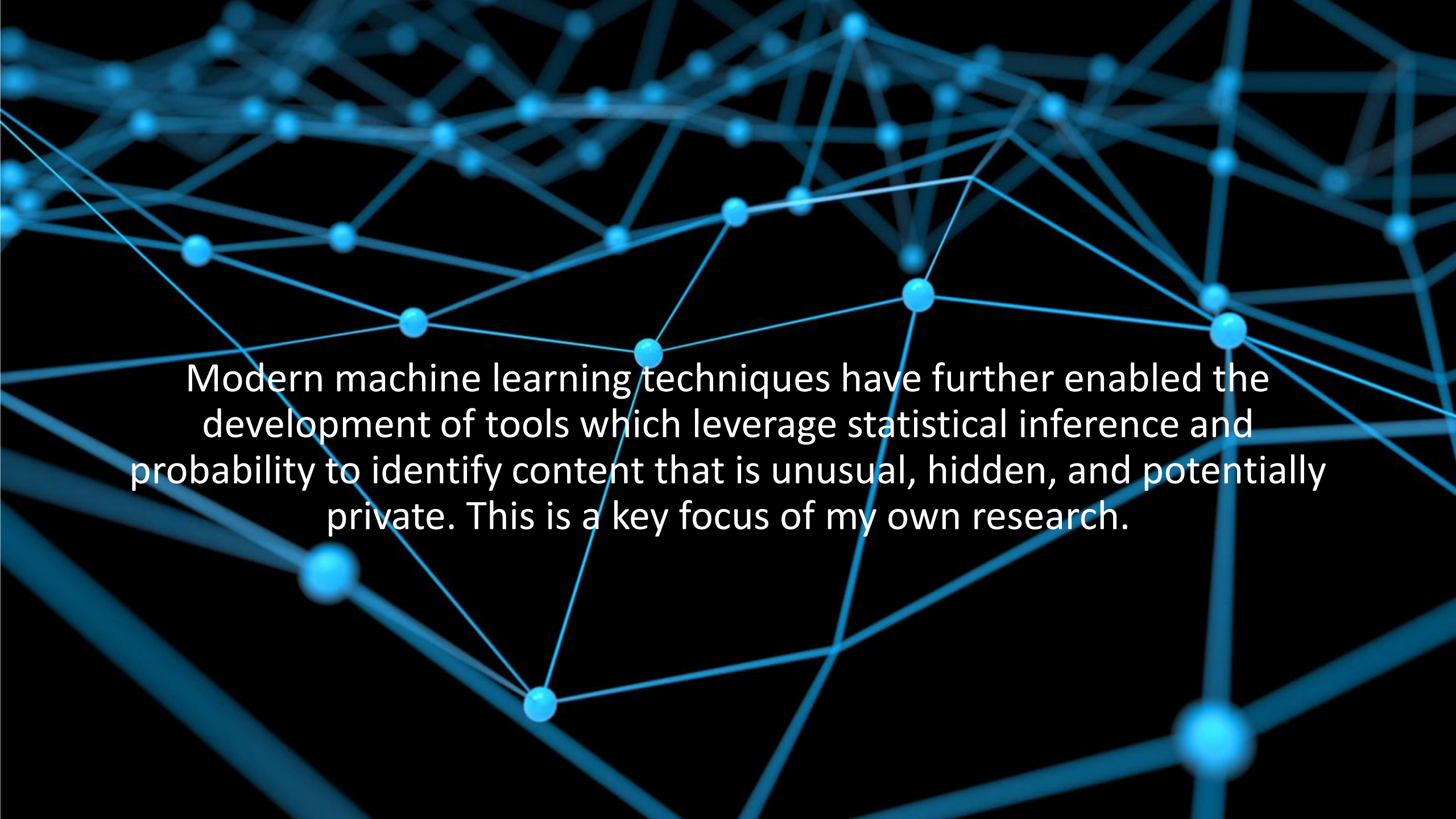
Lawyers Starting To Utilize Machine Learning

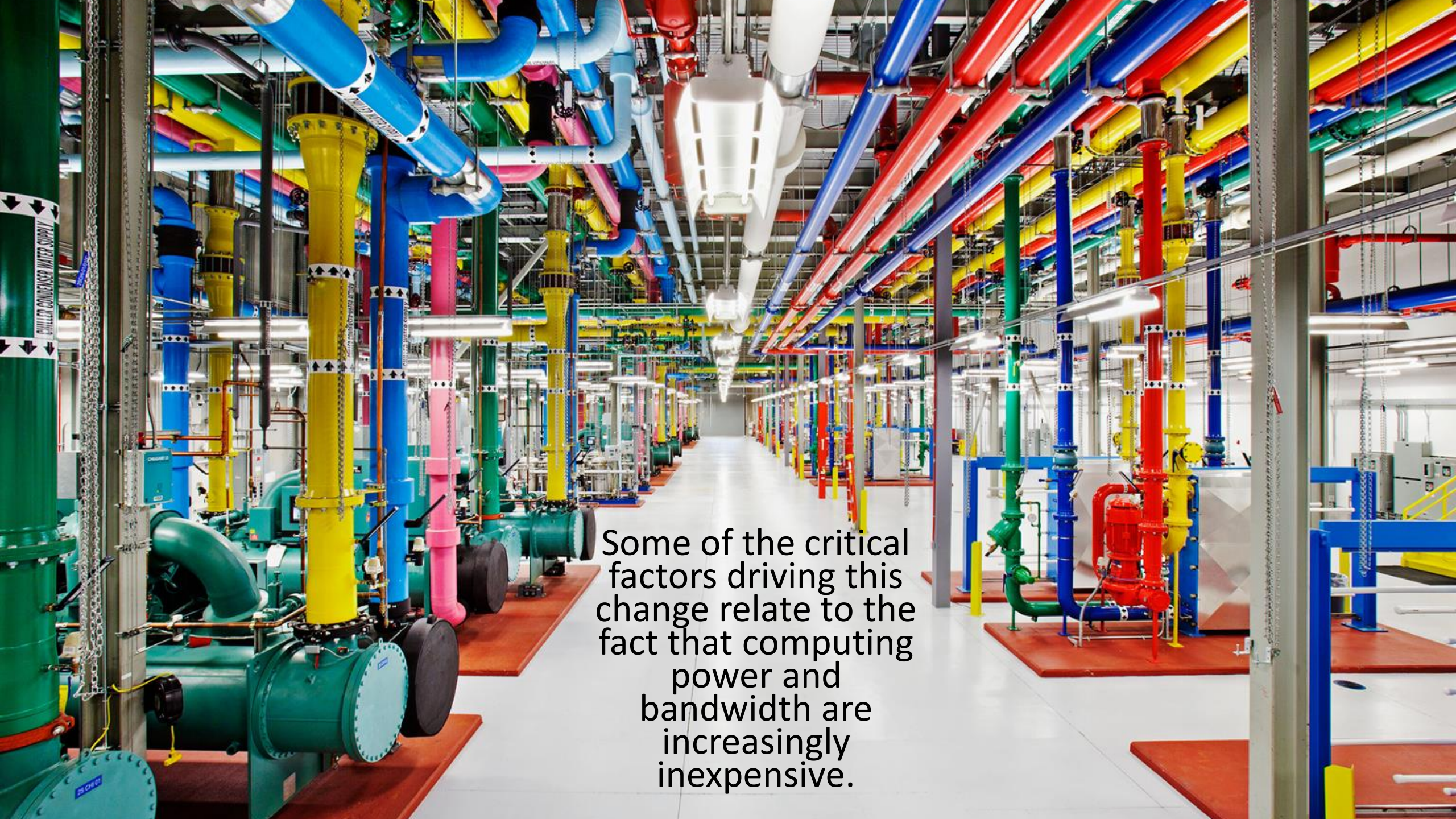
- Lawyers are using more advanced search methods, now presently categorized under the names “predictive coding” or “technology assisted review,” when a need exists to search data sets for responsive documents.

- In various ways, all of these methods use analytical means (algorithms) to group or classify similar types of data together. In doing so, lawyers have been able to search through millions of electronic documents in extremely short intervals of time (days and weeks, rather than months or years).



Machine Learning Is Also Advancing


Modern machine learning techniques have further enabled the development of tools which leverage statistical inference and probability to identify content that is unusual, hidden, and potentially private. This is a key focus of my own research.



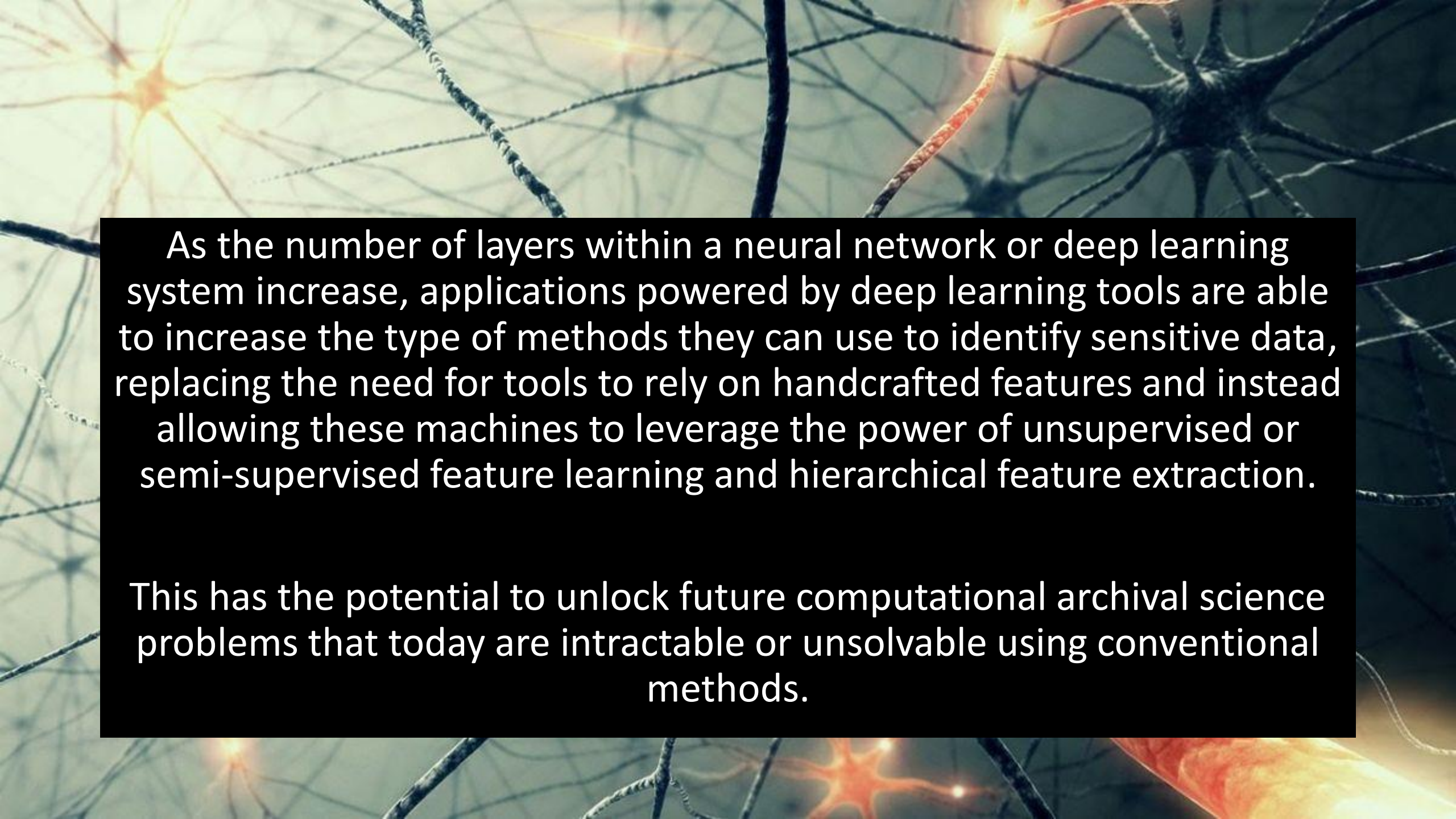
Some of the critical factors driving this change relate to the fact that computing power and bandwidth are increasingly inexpensive.

Machine Learning Has Produced Deep Learning

Mass processing, aided by advancements within the algorithmic research communities, in turn has laid the groundwork for the development of “deep learning” tools which attempt to model high level abstractions within data.

Advances in the area of deep learning, which build around the initial work on perceptrons and neural networks, and support the work developed in the area of support vector machines, have the potential to significantly improve the accuracy of machine learning algorithms, thus expanding the scope of problems that can be addressed.


We Are
Automating
Insights



As the number of layers within a neural network or deep learning system increase, applications powered by deep learning tools are able to increase the type of methods they can use to identify sensitive data, replacing the need for tools to rely on handcrafted features and instead allowing these machines to leverage the power of unsupervised or semi-supervised feature learning and hierarchical feature extraction.

This has the potential to unlock future computational archival science problems that today are intractable or unsolvable using conventional methods.

We Are Also Opening Up New Problems

- There are critical challenges?
  - How do you help a computer learn without providing it bias?
  - How do you teach a computing device context or representations?

- How do we build models that can analyze text using methods of handling text through representation that do not rely on the pre-population of words, phrases, sentences or any other syntactic or semantic structures associated with a language are starting to evolve?

- How do we evolve our statistical knowledge to keep up and bridge the gap between archival science, computational science & statistics – as well as the areas – Computational Archival Science

- How do we do everything faster?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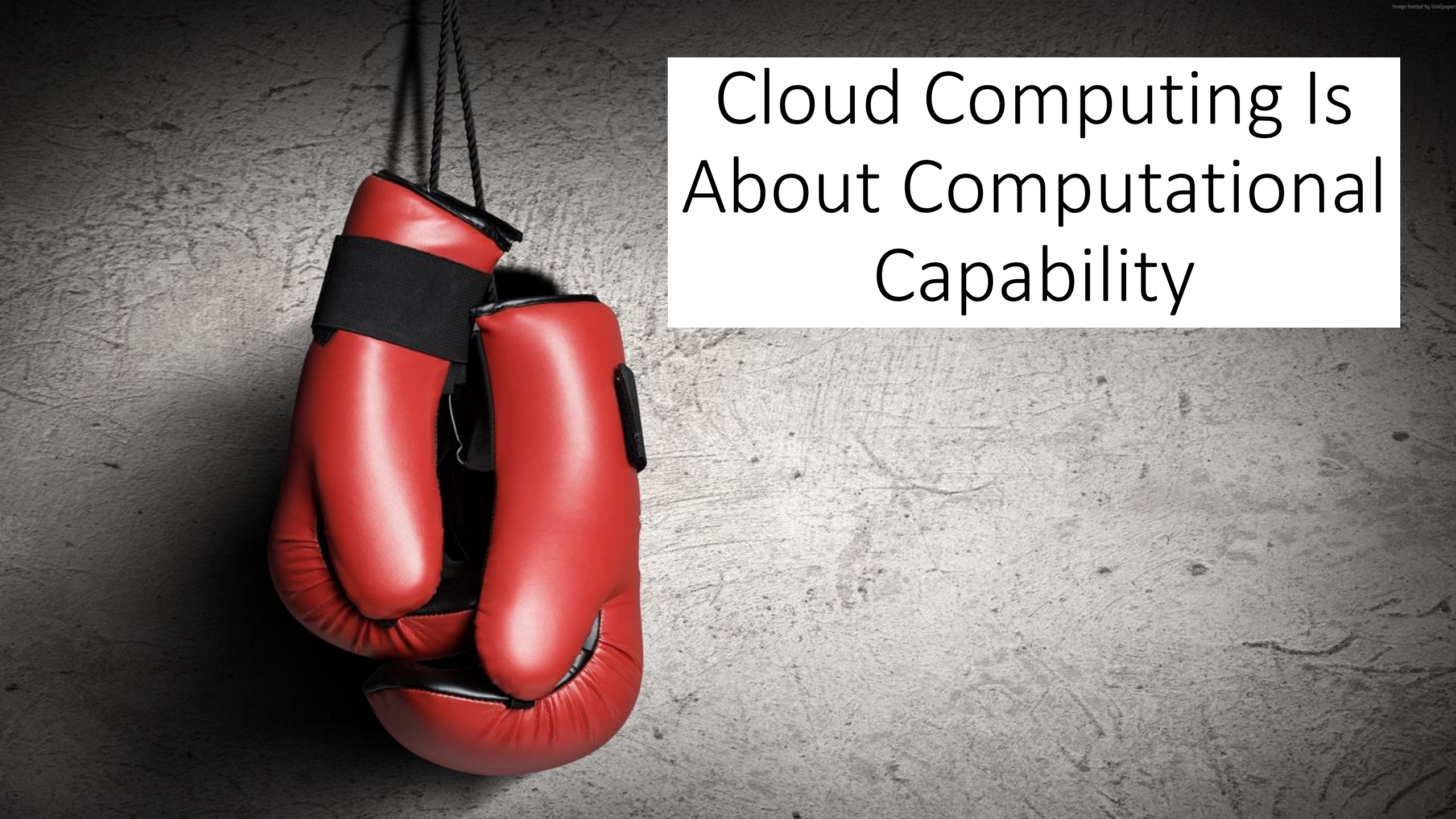
We Leverage The Cloud & Cloud Computing

Organizations understand what cloud computing is, but I would argue many do not understand the linkages and capabilities that cloud computing can enable.

I believe this is because both computational scientists and statisticians have not engaged enough with the archival community on the most central problems.



Cloud Computing Is About Computational Capability

Cloud computing has given organizations the ability to access vast amounts of computing power. This power is especially useful for applications and technologies that require significant amounts of data for mining, or need significant power to mine vast quantities of hidden data that were previously un-accessible in a finite time.

With this kind of power, organizations both public and private have been able to create new ways to store data that promise to be beneficial for data discovery, leading to concepts such as Enterprise Data Hubs (EDH)’s, data lakes, and other tools.

Cloud Computing

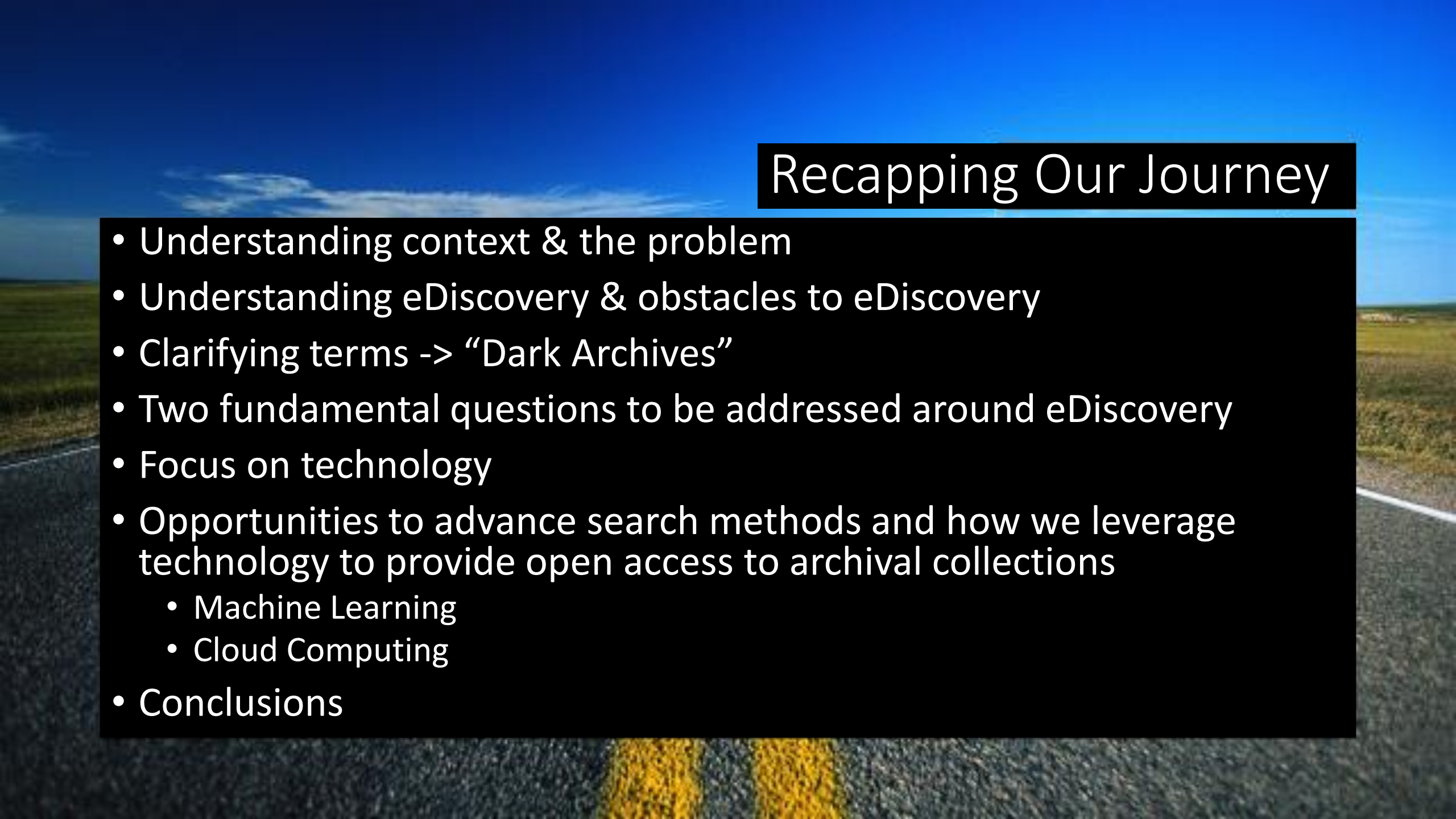
Cloud based storage allows organizations to archive vast amounts of data in its raw state, thus preserving its provenance qualities.

Once this data is archived, distributed processing within the cloud enables once inaccessible data to be accessible in manageable time frames. This production capability has given organizations the ability to drastically reduce the time spent querying records while significantly increasing the quantity of data that can be analyzed. This allows organizations to test more statistical and machine learning models


But, the key is to get the data organized …

The Impact On Archivists Is Key

- Going forward, cloud computing, by putting even more computing power directly at the fingertips of archivists and those mining sensitive data, has the potential to change the landscape of sensitive data analysis.
- There is no technical reason why archivists cannot employ similar methods to find responsive archival records, for the purpose of providing earlier access in response to specific requests or as a matter of systematic openings



Recapping Our Journey

- Understanding context & the problem
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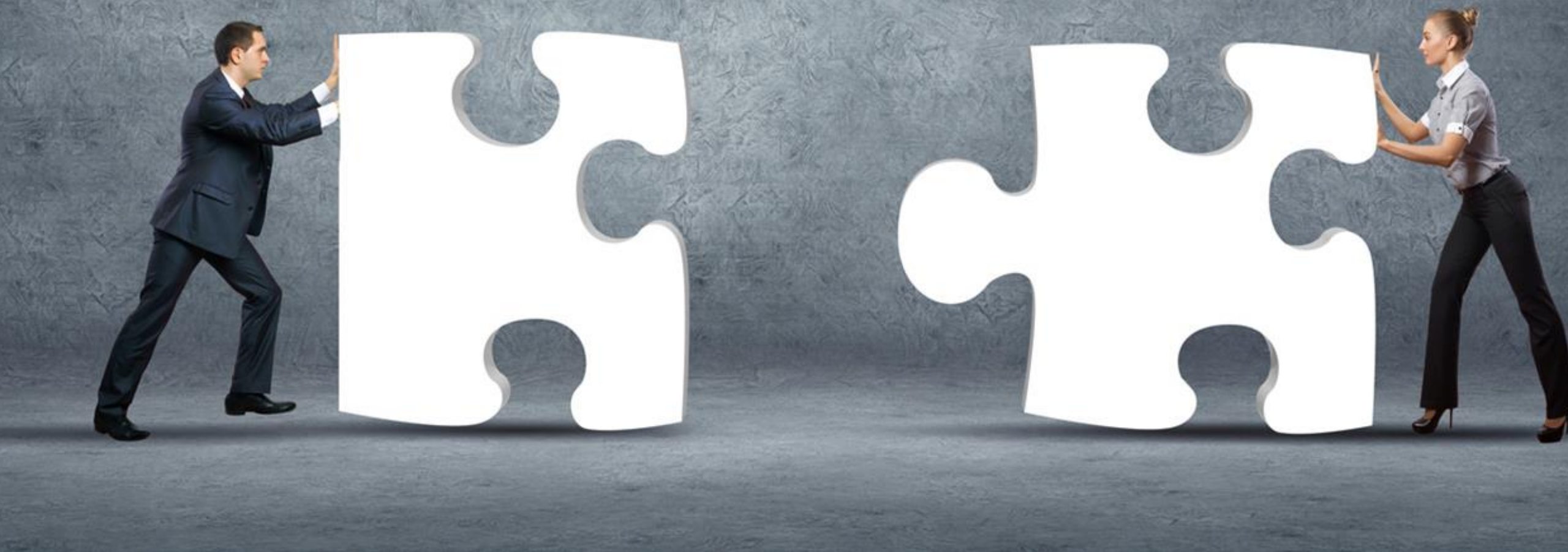
Conclusions & Key Results

Within eDiscovery, public servants must confront (especially in the U.S. at the federal level) a need to search what will soon enough be on the order of billions of e-mail records, coupled with many other related forms of electronic communications including in social media, accessioned into public archives.




In order that public access is not delayed for many decades, a combined research and policy agenda suggests itself as worthy of serious consideration & more engagement is needed!

Collaborate On Technology

- Governments with large public record collections in digital form – either already stored or coming soon – should be working with knowledgeable experts in computer and information science, drawn from both the academic and commercial sectors, to better understand the search and filter capabilities of machine learning algorithms.
- Ideally, experimenting with various types of machine learning methods through the use of research grants and pilot projects will enable archivists and others more efficiently to categorize sub-collections of records as potentially containing sensitive records, and to isolate sensitive content in a manner that allows “public-use” versions of archival holdings to be accessed.
- Push the limits and our understanding of methods using problems

The challenge posed by dark archives should be squarely addressed in suitable public forums devoted to open government and e-democracy. We must also consider the impact on the *UN Sustainable Development Goals, Open Government Partnership, EU Open Data Maturity Model, Universal Declaration of Archives.*