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# INTRODUCTION TO BUSINESS DATA ANALYTICS

AN ORGANIZATIONAL VIEW

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# Introduction to Business Data Analytics: An Organizational View



International Institute of Business Analysis, Toronto, Ontario, Canada.

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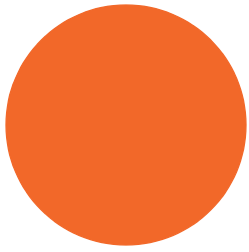
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# Introduction to Business Data Analytics: An Organizational View

## Analytics: An Organizational View

The Introduction to Business Data Analytics: An Organizational View introduces business analysis concepts, activities, tools, techniques, skills and how they're applied when establishing business data analytics capabilities for the organization.

Business data analytics has become an area of great interest for organizations, as it has been recognized as a means by which organizations can obtain valuable insights from data; supporting more informed business decision-making. As a result, more organizations are investing in business data analytics as a means to deliver on their strategic imperatives, innovate, and obtain competitive advantages in the marketplace. Such investments are driving the demand for more skilled professionals with business data analytics knowledge and experience.

This Introduction to Business Data Analytics: An Organizational View explores the relationship of business data analytics to business analysis, emphasizing how organizations can leverage the business data analytics cycle, team structures and required skills, and strategy for business data analytics to increase effective decision-making.

### 1.1

## What is Business Data Analytics?

As a broad definition, business data analytics is a practice by which a specific set of techniques, competencies, and procedures are applied to perform continuous exploration and investigation of past and current business data for the purposes of obtaining insights about a business that can lead to improved decision-making. Business data analytics can be defined more specifically through several perspectives.

These perspectives include, but are not limited to business data analytics as a:

- movement,
- capability,
- data-centric activity set,
- decision-making paradigm, and
- set of practices and technologies.



### 1.1.1 **Business Data Analytics as a Movement**

Business data analytics as a movement involves a management philosophy or business culture of evidence-based problem identification and problem-solving. In this perspective, evidence through data is the driver of business decisions and improvement. When this philosophy is in place, evidence is not chosen to support a preconception or point of view; instead, all available applicable evidence is used to make informed business decisions.

### 1.1.2 **Business Data Analytics as a Capability**

As a capability, business data analytics includes the competencies possessed by the organization and its employees. Business data analytics competency is not solely limited to the ability of an organization to complete analytical activities. It also includes capabilities such as innovation, culture creation, and process design. The capability or lack thereof may define or constrict what the organization is actually capable of achieving through business data analytics.

### 1.1.3 **Business Data Analytics as a Data-centric Activity Set**

As an activity set, business data analytics includes the actions required for an organization to use evidence-based problem identification and problem solving. Business data analytics has been defined by expert practitioners as involving six core data-centric activities:

- accessing,
- examining,
- aggregating,
- analyzing,
- interpreting, and
- presenting results.

### 1.1.4 **Business Data Analytics as a Decision-making Paradigm**

As a decision-making paradigm, business data analytics is a means for informed decision-making. Through this lens, business data analytics is considered the tool of making decisions through the use of evidence-based problem identification and problem-solving.

### 1.1.5 **Business Data Analytics as a Set of Practices and Technologies**

Business data analytics is also considered a set of practices and technologies required to perform the analytics work itself. These practices can be discussed in the context of five business data analytics domains:

- Identify Research Questions,
- Source Data,
- Analyze Data,
- Interpret and Report Results, and
- Use Results to Influence Business Decision-Making.

## 1.2 Business Data Analytics Objectives

Organizational leaders frequently make business decisions based on personal expertise and instinct. Business data analytics removes cognitive and personal biases from the decision-making process by using data as the primary input for decision-making. When performed well, business data analytics can create a competitive advantage for the organization.

For example, algorithms based on weather, soil, and other conditions have been found to be more accurate in predicting the price and quality of red wine after it has been aged compared to the wine experts who influence the decision-making based on their own cognitive biases as to what they enjoy and do not enjoy in a wine.

In a broad sense, the objective of business data analytics is to explore and investigate business problems or opportunities through a course of scientific inquiry. The specific objectives of business data analytics are dependent on the type of analysis that is being performed.

There are four types of analytics methods:

- **Descriptive:** provides insight into the past by describing or summarizing data. Descriptive analytics aims to answer the question “What has happened?”
- **Diagnostic:** explores why an outcome occurred. Diagnostic analytics is used to answer the question “Why did a certain event occur?”
- **Predictive:** analyzes past trends in data to provide future insights. Predictive analytics is used to answer the question “What is likely to happen?”
- **Prescriptive:** utilizes the findings from different forms of analytics to quantify the anticipated effects and outcomes of decisions under consideration. Prescriptive analytics aims to answer the question “What should happen if we do ...?”

TIME / QUESTION TYPE	WHAT	WHY
PAST	DESCRIPTIVE What happened?	DIAGNOSTIC Why did it happen?
PAST/FUTURE	PREDICTIVE What is likely to happen based on past trends?	
FUTURE	PRESCRIPTIVE What should happen if we take a certain path? What is the best outcome given the uncertainty?	

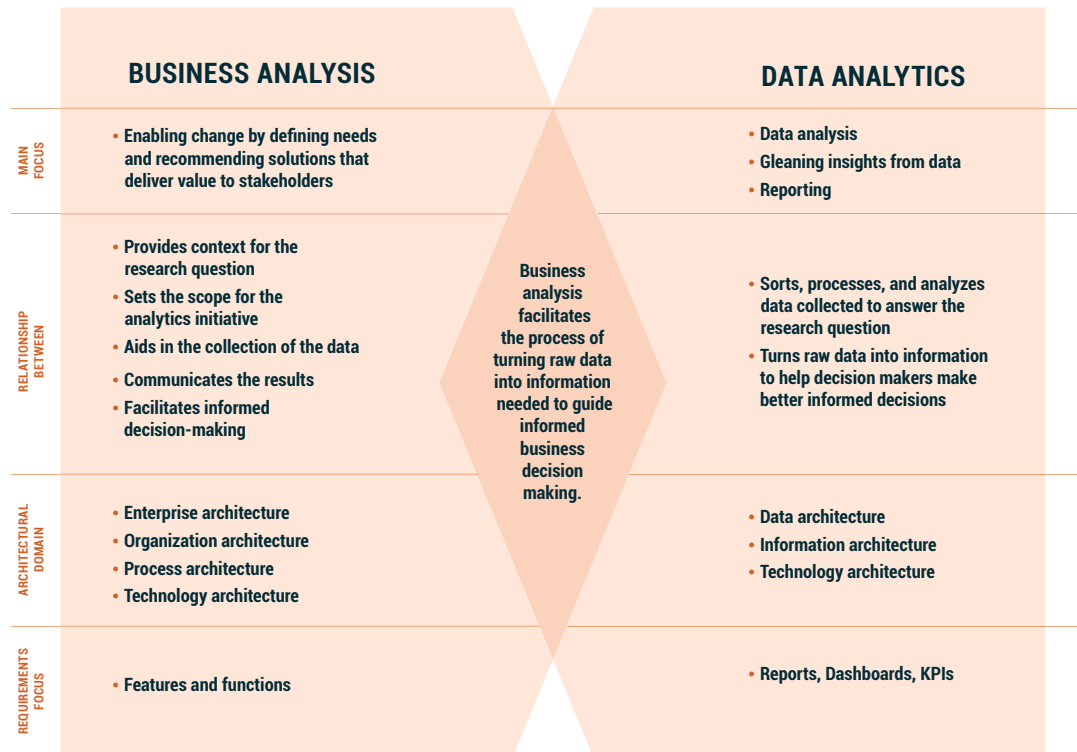
# 1.3 Business Analysis and Business Data Analytics

The terms business data analytics and business analysis are frequently used interchangeably. However, there are significant differences between the two terms. Business analysis is the practice of enabling change in an enterprise by defining needs and recommending solutions that deliver value to stakeholders. Comparatively, business data analytics is focused on the process of data analysis.

Business analysis provides the business context for business data analytics. Business analysis defines the focus for the research questions being asked and sets the scope before data is collected. Business analysis also aids in the collection of data and the implementation of the data collection processes. Business data analytics is used to sort, process, and analyze the data once assembled.

Once the analysis of the collected data is complete, business analysis activities are performed to interpret the results obtained from analytics and transform information into business decisions. Business analysis activities are performed to communicate the results of business data analytics and facilitate the implementation of informed business decisions made as a result of what is learned from analyzing the data collected.

Some consider business data analytics as a specialty or subset of business analysis; one that is focused on data analysis. This viewpoint is taken since many skills and competencies often discussed when defining business analysis are equally important when performing business data analytics work.





# 2

## The Business Data Analytics Cycle

The business data analytics cycle represents the research aspects of business data analytics. It is an iterative cycle initiated through the development of a well-formed research question and then explored through targeted, but thorough data analysis.

The cycle is based on the scientific method. The scientific method is a process for research that is used to explore observations and answer questions. The process starts by asking a question that scopes the research and is phrased as who, what, when, where, which, why or how. Based on these questions, background research is completed to inform the research and create a smaller scoped question. A question is then raised using the following possible format:

If \_\_\_\_\_ happens then will \_\_\_\_\_ happen, or

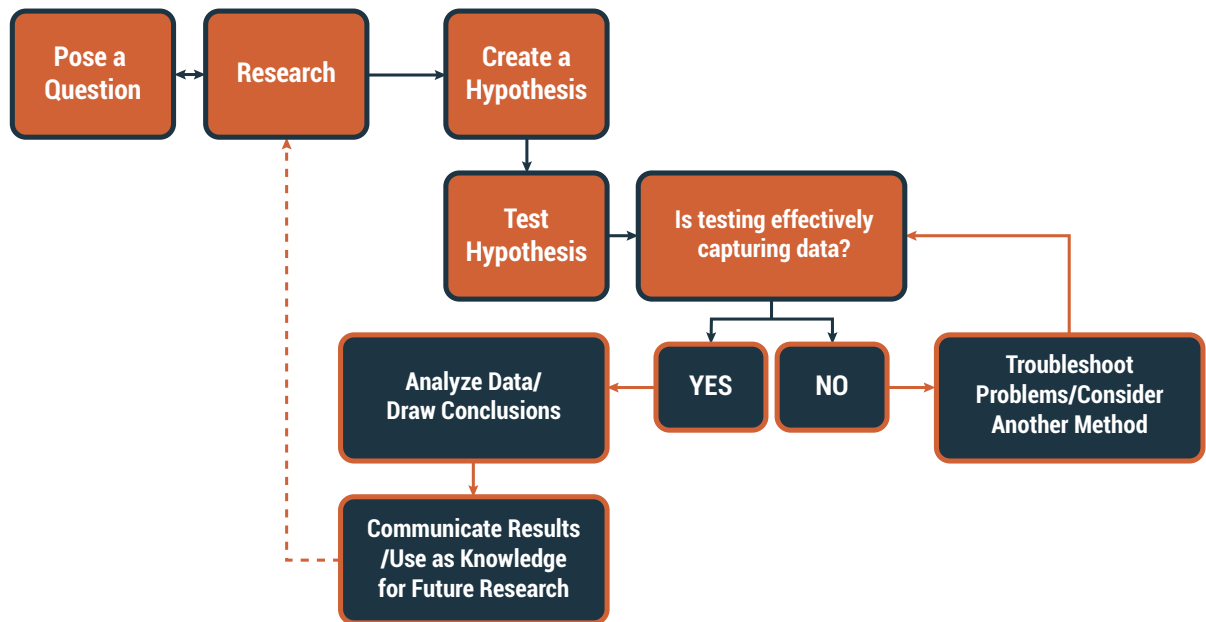
Is \_\_\_\_\_ different to \_\_\_\_\_, or

Does \_\_\_\_\_ affect \_\_\_\_\_ etc.

The question is then tested using a method or procedure, and the results are analyzed to draw conclusions based on the smaller scoped question.

Business data analytics focuses on the data collection and data analysis part of the scientific method while the processes before and after this are informed by business analysis. Business data analytics requires business analysis to ensure the data analysis is focused on raising questions that are of importance to answer and that the data drives valuable insights for resolving important business situations (problem or opportunity).

The scientific method paired with the business data analytics cycle looks as follows:



Despite its similarities to the scientific method, the business data analytics process has some slight differences. For one, the business data analytics process may differ depending on the type of analysis taking place. Testing may not always include an experiment to collect data, as the data might simply be downloaded from a server using existing data sources. In business data analytics, it is necessary to perform data validation and verification on the data collected. In the scientific method, data validation is not required because the data collected as part of a scientific experiment is obtained in a controlled lab environment.

When the objective of the analytics effort is continuous improvement or some other metric of improvement over time, the business data analytics cycle is on-going and iterative.

In the context of projects, with defined endpoints, the conclusions drawn from a project may be used to form new research questions in-turn perpetuating another execution of the entire business data analytics cycle.

3

## Team Structure and Required Skills

For any data-driven engagement to succeed, there needs to be a partnership between those providing the business experience (business stakeholders and business analyst) and those with the technical skills: the data analysts and scientists. These roles work collaboratively to ensure the business context is properly translated to guide the analytics activities appropriately and to find the best ways to obtain value from available data.

There is no optimal team structure that works for every business data analytics initiative. Business data analytics teams require resources having a mix of business and technical skills. Teams who excel technically augment the team with members who possess strong business knowledge or acquire the knowledge themselves. Teams that are comprised of resources with strong business knowledge seek out those with technical skills to help with the data acquisition, cleansing, and analysis work. This latter scenario is evolving due to the advancements being made in the tool market simplifying the steps for creating models and performing analytics. The role of the 'citizen data scientist' has emerged where business resources can now play an active role in conducting analytics research without having to possess the advanced skills of a data science expert.

For a large organization the team structure may consist of any or all of the following roles:

- **Subject Matter Experts (SMEs):** provides specific knowledge of the business sector or specified business domain.
- **Data architect:** develops data systems to capture and store data. Generally, does not program systems as that is the job of the data engineer.
- **Data engineer:** develops and maintains data systems.
- **Data scientist:** applies advanced technical skills to create and run analytics models to obtain insights from data.

- **Data analyst:** interprets and analyzes data. May work under the direction of the data scientist.
- **Data journalist:** turns results into something that can be communicated to anyone within the organization.
- **Business analyst:** establishes the scope for the analytics work and utilizes results to support business decision-making and implementation of the resulting decisions.

The structure of a business data analytics team can be dependent on a number of factors, including:

- the size of the organization,
- industry,
- current capabilities, and
- tools.

For small organizations, it may be possible to hire a single person to perform all the roles. In a smaller organization, or one that is new to business data analytics, a data scientist with the help of SMEs and IT professionals, may be sufficient. For each of these roles, there are different levels of experience, skills, and educational accomplishments required.

# 4

## Strategy for Business Data Analytics

Strategy for business data analytics includes the activities to build the capacity and capability for data analytics within an organization. This includes building a business data analytics team, establishing best practices, curating data, performing ongoing data management functions, and developing a data strategy.

Strategy for Business Data Analytics includes:

- Building a Business Data Analytics Team
- Establishing Best Practices
- Curating Data
- Performing Data Management Functions
- Developing a Data Strategy
- Techniques

### 4.1

## Building a Business Data Analytics Team

Due to the growing interest in business data analytics, the demand for skilled practitioners in data science and analysis is on the rise. Resources are in high demand, resulting in an increase in salaries. Organizations interested in using business data analytics as a strategic advantage or applying it enterprise-wide will be dependent on selecting and retaining top talent to build out their practice. While retention may be based heavily on salary level, there are several other factors that can influence the ability of an organization to build and retain a talented data team.

For example: having the

- opportunity to work on engaging and exciting initiatives,
- ability to work directly with key decision-makers,
- opportunity to learn the business,
- ability to solve complex business problems, and
- access to sufficient tools to perform the job.

## 4.2 Establishing Best Practices

Best practices in business data analytics are established through the accumulation of experience, lessons obtained from completed work, and being up to date on industry trends, including advancements being made in technology.

Establishing best practices in business data analytics involves identifying a standard set of tools and techniques that work well for the organization, for the types of problems being solved, and for the skill set and capabilities available. Best practices may be used as suggestions or formed to provide a set of standards that are required to be followed by members of the analytics teams. For example, in establishing best practices, an organization may develop policy to ensure that sampling methods between different analytics projects are shared across teams. Another application of best practice may be maintaining subsets of analytics requirements for re-use or establishing a procedure for securing approval for data access. Whatever the practice is, the motivation for identifying, stating, and developing policies around best practices is to mature the analytics work in a way that fosters improved performance of the work and moves the organization forward to obtain more value from the investments being made in business data analytics.

## 4.3 Curating Data

Data curation involves the collection, aggregation, and integration of data from different sources. Early data curation processes focused heavily on obtaining data from transactional systems, but today's big data environments require more sophisticated tools and approaches to obtain data from a wide variety of sources.

Data curation is more than blending data together. One of the main objectives is to transform data from disparate sources in a manner where the new whole is worth more than the individual parts; meaning, once transformed, the value obtained from the curated data is more valuable than the value obtained from each individual data source.

When establishing a company-level practice for data analytics, data curation is used to build the repositories and source the data that analytics teams rely on, streamlining the processes to obtain, clean, and preserve data, and establishes a mindset of utilizing data as a corporate asset.

## 4.4 Performing Data Management Functions

Data management consists of the practices performed to administer data across an organization. Its major functions include:

- **Data governance:** is the rules and policies that manage the data assets of an organization to ensure high-quality data.
- **Data architecture:** is the models and standards that govern how data is collected, stored, and integrated across an enterprise.
- **Data security:** are the activities performed to protect data from a privacy and confidentiality perspective.
- **Meta data management:** is the administration of information that is maintained about the data assets an organization collects and manages

As organizations look to set an organization-level strategy for business data analytics, more formal policies and processes are established to improve how data is acquired, integrated, and accessed.

## 4.5 Developing a Data Strategy

Making an investment in business data analytics is no different from investing in project management or business analysis; the organization must obtain value for the money it is spending on the discipline. Business data analytics needs to deliver value in order to obtain sponsor support and be sustainable for the long-term. Just as an organization performs thorough up-front analysis before initiating a new initiative, the same holds true for investments made in business data analytics.

One way to ensure value from business data analytics efforts is to align the data strategy to the business strategy. Doing so helps to ensure the data analytics work focuses on addressing the right situations (problems or opportunities) that truly help the organization deliver on its business strategy. Without this alignment, the business data analytics team is collecting and analyzing data that is of little value to the overall direction the business is heading. This alignment is important at the onset when teams are identifying the research questions to explore.

Facilitating discussions that enable the business data analytics team to understand the business model and providing the results from the current state analysis to guide the definition of the data strategy are activities best performed by those who possess strong business analysis skills.

## 4.5.1 Business Strategy Supporting Data Strategy

A business strategy defines a roadmap or plan an organization uses to achieve its strategic goals and objectives. Developing a business strategy is a function of management, but the strategy itself should be leveraged by all areas of the organization to guide lower-level plans, objectives, and the work itself. Business data analytics initiatives use the business strategy to guide and align analytic initiatives. The organization as a whole benefits from the insights discovered through the successful execution of the data strategy which in turn helps to deliver on the business strategy.

## 4.5.2 The Data Strategy

A data strategy defines a roadmap for using an organization's data to enable better informed decision-making, obtain competitive advantages, and generate business value. Data strategies are used to enable the organization to achieve its strategic goals. Businesses who develop data strategies understand the importance of using their data to glean insights by which to guide future decision-making. They recognize that data is a valuable asset to be managed and they leverage their data as a tool to deliver on their strategic imperatives. A data strategy is used to define the types of data that will be collected and cleaned, the understandings that are being sought, and the ways data will be used to obtain competitive advantages. Innovation should be an underpinning to all aspects of the data strategy.

Building a data strategy requires a firm understanding of the business. IT frequently lacks sufficient understanding of the business to develop the data strategy independently. On the business side, subject matter experts often lack sufficient knowledge about technology to know how it can best be applied to relate and analyze the data. This necessitates that building the data strategy is a collaborative effort in which IT and business work together. Business analysis skills such as analytical thinking and problem-solving, business acumen, system knowledge, and interaction skills such as facilitation, negotiation and conflict resolution help business data analytic professionals build an effective data strategy.

### Components of a Data Strategy

Many organizations develop their own templates for building and communicating a data strategy. How formal the template and process is to create a data strategy is dependent on the practices and methodologies used within the organization. Much of the value achieved from specifying a data strategy can be obtained through the collaboration and discussions held between IT and the business stakeholders.

Whether the organization is using a predictive, adaptive, or a hybrid delivery approach, a data strategy should address how an enterprise will identify, store, manage, share, and use its data.



## 4.6 Challenges for Business Data Analytics

The following are some of the challenges that organizations may face with business data analytics:

- Business alignment and priorities from a data perspective can be difficult to define.
- Making decisions on topic, scale, or scope for a data initiative can be tricky.
- Determining which data to measure and capture to achieve business objectives can prove challenging.
- Finding data that creates value may be difficult; not all data helps make better decisions.
- Even when the data source is identified, defining the specific subset of data needed can be complex.
- Poor or unknown quality of data, especially historical.
- Data integration and accessibility. Data being placed in disparate systems, and of varying format and quality.
- Business stakeholders not being comfortable with the rapid changes occurring in the business data analytics space.
- Difficulty bringing business stakeholders to a shared understanding on value when sharing data assets across business domains.
- Lack of experience or knowledge for those completing the analysis as well as the managers receiving the results.
- Change in organizational culture required to trust insights gleaned from data over experience and intuition.
- Business managers finding it challenging to structure data teams.
- Difficulty finding the right tools.

## 4.7 Techniques

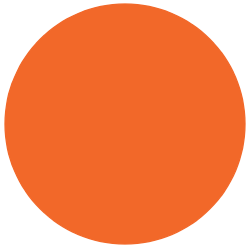
There are a host of techniques used when building a data strategy. Many of the techniques listed here can be used by analysts to drive valuable discussions between the business stakeholders and the IT representatives. Most of the techniques result in the creation of visual models that can be leveraged on an ongoing basis to help the team, comprised of both business and IT resources, understand the context surrounding and influencing the business data analytics work being performed.

While this list is not exhaustive, it does highlight some of the major techniques in use today by business data analytics teams when developing a data strategy:

- **Balanced Scorecard:** a strategic planning and management tool used to measure organizational performance. It is outcome focused and provides a balanced view of an organization by implementing the strategic plan as an active framework of objectives and performance measures. Within

business data analytics, this technique is used to measure both internal and external elements in order to bring a shared understanding between business stakeholders and IT about organizational performance and how the organization is currently meeting its customer obligations.

- **Benchmarking and Market Analysis:** provides an understanding of where there are opportunities for improvement in the current state. Specific frameworks that may be useful include 5 Forces analysis, PEST, STEEP, and CATWOE. The results from this type of analysis are useful to provide an understanding of the external environment surrounding the organization and how the performance of different aspects of the business compare to the leaders in the industry.
- **Business Model Canvas:** provides an understanding of the value proposition the organization satisfies for its customers, the critical factors in delivering that value, and the resulting cost and revenue streams. It is a helpful technique for understanding the context for any change and identifying the problems and opportunities that may have the most significant impact. On business data analytics initiatives, this technique can be used to facilitate collaborative discussions with business stakeholders and IT representatives enabling everyone involved to achieve a comprehensive understanding of the critical aspects of the business.
- **5 Forces analysis:** a framework that can be used to provide an understanding of where there are opportunities for improvement within the current state of the organization. It involves analyzing aspects of the competitive landscape and the powers held by suppliers and buyers. On a business data analytics initiative, this technique helps to understand the competitive forces impacting the organization.
- **Metrics and Key Performance Indicators (KPIs):** are used to measure the performance of solutions, solution components, and other matters of interest to stakeholders. On business data analytics initiatives, KPIs are used to identify the key results expected from data analysis efforts.
- **SWOT:** is used to evaluate the strengths, weaknesses, opportunities, and threats to the current state of the organization. On business data analytics initiatives facilitating discussions to complete a SWOT analysis will provide context about the internal and external environments of the organization.
- **Value chain analysis:** is a model used to identify the key activities performed within an organization and to analyze how each contributes to the value provided by the products and services delivered to its customers. Value chain analysis is a technique used in business data analytics to provide a shared understanding of how the organization provides or may provide value to its customers. It can be used to facilitate collaborative discussions between business stakeholders and IT to drive innovation in order to improve an organization's competitive advantage.



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