

# **B.M.S College of Engineering**

**P.O. Box No.: 1908 Bull Temple Road,  
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## **DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING**



**Course – BIG DATA ANALYTICS**

**Course Code – 20IS6PEBDA**

**Final report on Project work**  
**IBM Cognos Analytics**

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## DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING



### CERTIFICATE

Certified that the Project has been successfully presented at **B.M.S College Of Engineering** by **K R Kaushik Kumar and Jyothsna R**, bearing **USN: 1BM20IS223 and 1BM20IS057**, in partial fulfillment of the requirements for the VI Semester degree in **Bachelor of Engineering in Information Science & Engineering** of Visvesvaraya Technological University, Belgaum as a part of the course **Big Data Analytics (20IS6PEBDA)** during academic year 2022-2023.

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**Designation – BIG DATA ANALYTICS**

**Department of ISE, BMSCE**

### **Table of Contents**

<b>Sno</b>	<b>Title</b>	<b>Page no.</b>
<b>1</b>	Abstract	4
<b>2</b>	Introduction	5
<b>3</b>	Tool Name	6
<b>4</b>	Purpose of the tool	7
<b>5</b>	Application of the tool	8
<b>6</b>	Working of the tool	10
<b>7</b>	Installation	12
<b>8</b>	Sample execution	17
<b>9</b>	Outcome of the demo	20
<b>10</b>	Outcome of the study	21
<b>11</b>	How it is Better?	22
<b>12</b>	References	23

## **Abstract**

Big data analytics is a rapidly growing field that focuses on extracting valuable insights from vast and complex data sets. With the exponential growth of digital information, organizations now have access to unprecedented amounts of data that hold immense potential for decision-making and business optimization. Big data analytics leverages advanced techniques such as data mining, machine learning, and predictive modeling to uncover patterns, correlations, and trends that traditional analytics methods may overlook.

This abstract highlights the key steps involved in big data analytics, including data collection, storage, processing, analysis, and visualization. It emphasizes the scalability and distributed nature of big data platforms, enabling efficient processing of large data sets. The abstract also mentions the challenges associated with big data analytics, such as data privacy and security concerns, as well as the demand for skilled data scientists and analysts.

## **Introduction**

In today's data-driven world, organizations face a constant influx of massive and complex data from various sources such as social media, sensors, transactions, and more. This deluge of data holds immense potential, but it can be overwhelming to extract meaningful insights and derive value from it using traditional methods. This is where big data analytics comes into play. Big data analytics is a rapidly evolving field that focuses on harnessing the power of advanced techniques, tools, and technologies to process, analyze, and interpret large volumes of data to gain valuable insights and drive informed decision-making.

By employing cutting-edge technologies like distributed computing, cloud computing, and machine learning, big data analytics enables organizations to uncover hidden patterns, correlations, and trends that were previously inaccessible. The key objective is to transform raw data into actionable intelligence that can drive innovation, optimize operations, enhance customer experiences, and gain a competitive advantage in today's dynamic business landscape. Big data analytics finds applications across various sectors, including finance, healthcare, marketing, manufacturing, and more. It allows organizations to make data-driven decisions, identify emerging trends, mitigate risks, and capitalize on new opportunities. However, it also presents challenges such as data security, privacy concerns, data quality, and the need for skilled professionals who can effectively navigate the complexities of big data analytics.

Tool Name



IBM  
Cognos  
Analytics

## Purpose of Tool

**IBM Cognos Analytics** is a business intelligence and analytics platform developed by IBM. Its purpose is to provide organizations with powerful tools for data exploration, analysis, and reporting to help them make informed business decisions. Here are some key purposes and functionalities of IBM Cognos Analytics:

1. **Data Integration:** Cognos Analytics allows organizations to integrate data from various sources, including databases, spreadsheets, and cloud-based platforms. It provides tools for data modeling, transformation, and cleansing to ensure data quality and consistency.
2. **Reporting and Dashboards:** The platform enables users to create interactive and visually appealing reports and dashboards. Users can design customized reports with charts, tables, and graphs to present data in a meaningful way. Dashboards provide real-time insights into key performance indicators (KPIs) and help monitor business metrics.
3. **Self-Service Analytics:** Cognos Analytics empowers business users to perform ad-hoc analysis and explore data independently without relying on IT or data analysts. Its intuitive interface and drag-and-drop capabilities make it easy for non-technical users to create queries, build visualizations, and discover insights.
4. **Advanced Analytics:** The platform incorporates advanced analytics capabilities, including predictive modeling, data mining, and statistical analysis. Users can leverage machine learning algorithms to uncover patterns, identify trends, and make data-driven predictions to support strategic decision-making.
5. **Collaboration and Sharing:** Cognos Analytics facilitates collaboration among teams by providing features for sharing reports, dashboards, and insights. Users can publish and distribute reports to stakeholders, schedule automated report delivery, and enable secure access to information within the organization.
6. **Mobile Accessibility:** The platform offers mobile support, allowing users to access reports and dashboards on smartphones and tablets. This feature enables users to stay connected to their data and make informed decisions while on the go.
7. **Scalability and Security:** Cognos Analytics is designed to scale with the needs of organizations, accommodating large volumes of data and users. It also prioritizes data security, providing robust access controls, encryption, and compliance with regulatory requirements.

Overall, IBM Cognos Analytics aims to empower organizations with a comprehensive suite of analytics tools, enabling them to transform data into actionable insights, improve decision-making processes, and drive business performance.

## **Application of Tool**

**IBM Cognos Analytics** finds application across various industries and business functions. Here are some common applications of IBM Cognos Analytics:

1. **Business Performance Monitoring:** Organizations use Cognos Analytics to monitor and analyze key performance indicators (KPIs) and metrics to track the performance of their business operations. It enables real-time monitoring of sales figures, revenue, customer satisfaction, inventory levels, and other critical metrics.
2. **Financial Analysis and Reporting:** Cognos Analytics helps finance teams analyze financial data, create financial reports, and generate statements such as balance sheets, income statements, and cash flow statements. It allows for financial consolidation, budgeting, forecasting, and profitability analysis.
3. **Sales and Marketing Analytics:** Cognos Analytics enables sales and marketing teams to analyze sales data, customer behavior, and market trends. It helps identify sales opportunities, optimize pricing strategies, analyze campaign effectiveness, and measure marketing ROI.
4. **Supply Chain and Operations Management:** Organizations utilize Cognos Analytics to optimize their supply chain and operations. It helps monitor inventory levels, analyze production efficiency, track delivery performance, and identify bottlenecks or areas for improvement.
5. **Human Resources Analytics:** HR departments leverage Cognos Analytics to analyze workforce data, including employee demographics, performance metrics, attrition rates, and training effectiveness. It enables HR professionals to make data-driven decisions regarding talent acquisition, performance management, and employee engagement.
6. **Risk Management and Compliance:** Cognos Analytics aids organizations in managing risk and ensuring compliance with regulations. It enables the analysis of data related to fraud detection, risk assessment, and regulatory compliance, helping organizations identify and mitigate potential risks.
7. **Customer Analytics:** By analyzing customer data, Cognos Analytics helps organizations gain insights into customer behavior, preferences, and satisfaction levels. It supports customer segmentation, churn analysis, cross-selling, and personalized marketing initiatives.
8. **Healthcare Analytics:** In the healthcare industry, Cognos Analytics can be used to analyze patient data, healthcare outcomes, operational efficiency, and financial performance. It assists in healthcare planning, resource allocation, and quality improvement initiatives.



9. **Education Analytics:** Cognos Analytics can be applied in educational institutions to analyze student performance data, track academic progress, identify areas for improvement, and support decision-making related to curriculum development and student interventions.

These are just a few examples of the many applications of IBM Cognos Analytics. The platform's flexibility and extensive capabilities make it suitable for various industries and functional areas where data analysis and reporting are crucial for informed decision-making.

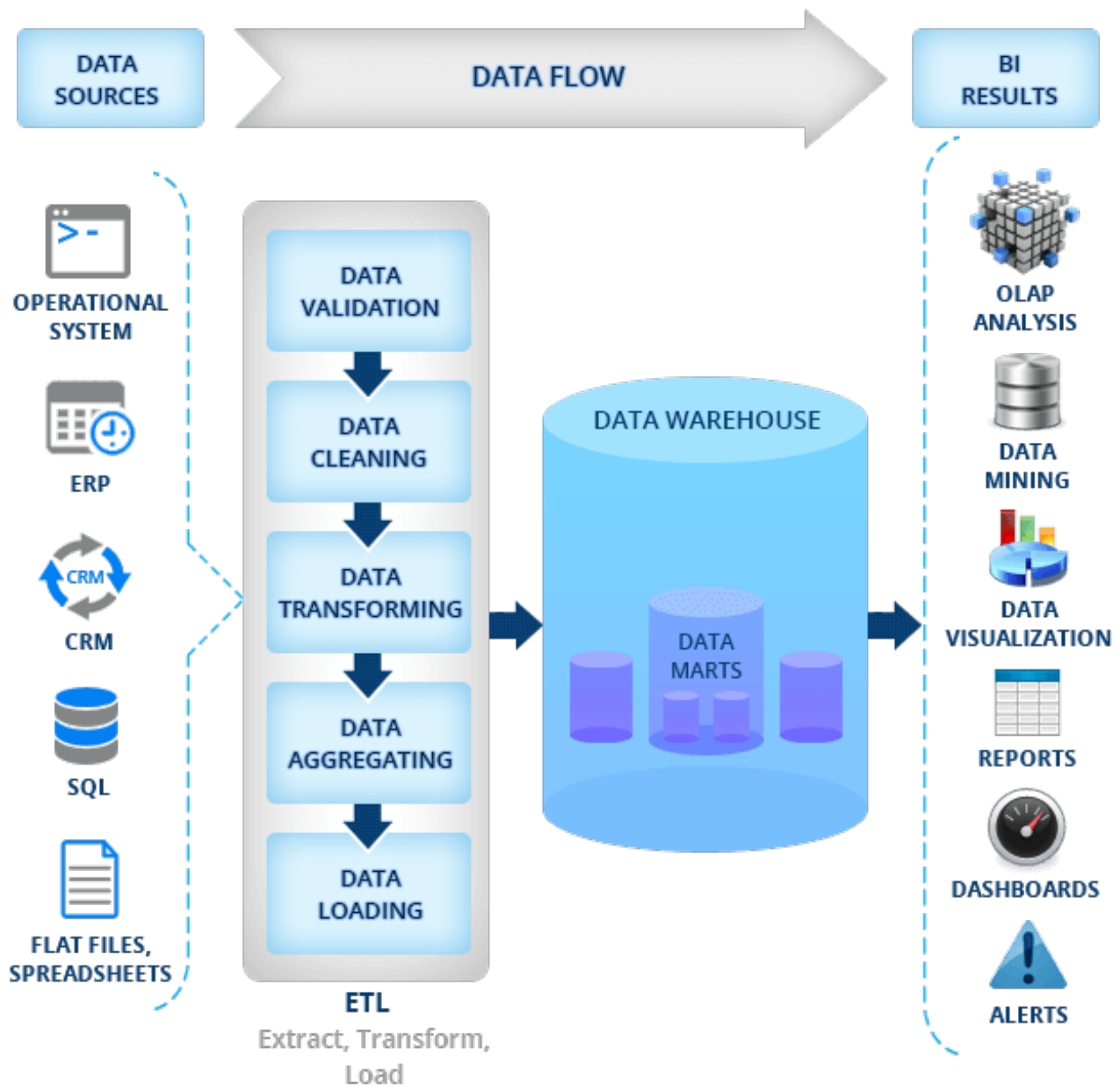


## Working of the Tool

**IBM Cognos Analytics** is a business intelligence and analytics platform developed by IBM. It is designed to help organizations gather, analyze, and visualize data to make informed business decisions. Here's a high-level overview of how IBM Cognos Analytics works:

1. **Data Integration:** Cognos Analytics can connect to various data sources, including databases, spreadsheets, and cloud-based platforms. It can extract and integrate data from these sources, allowing users to work with consolidated and up-to-date information.
2. **Data Modeling:** Once the data is integrated, Cognos Analytics provides tools to model and transform the data. Users can define relationships, calculations, and hierarchies to create meaningful representations of the data.
3. **Reporting and Dashboards:** Cognos Analytics offers a drag-and-drop interface that allows users to create reports and dashboards without requiring coding or advanced technical skills. Users can select data elements, apply filters, and choose visualization types to present the information in a visually appealing and easy-to-understand manner.
4. **Ad-Hoc Analysis:** Cognos Analytics enables users to perform ad-hoc analysis on the data. They can explore different dimensions, drill down into details, apply filters, and create custom calculations to gain deeper insights and answer specific business questions on the fly.
5. **Collaboration and Sharing:** Users can collaborate on reports, dashboards, and analysis within the Cognos Analytics platform. They can annotate, comment, and share their findings with colleagues, promoting collaboration and decision-making based on a shared understanding of the data.
6. **Data Governance and Security:** Cognos Analytics provides robust data governance capabilities. Administrators can define access permissions, control data sources, and ensure compliance with data security regulations. They can also track user activities and maintain an audit trail of data changes.
7. **Advanced Analytics:** IBM Cognos Analytics integrates with other IBM tools, such as Watson Analytics and SPSS, to enable advanced analytics capabilities. Users can apply predictive analytics, data mining, and statistical modeling techniques to uncover patterns, trends, and insights from the data.
8. **Deployment Options:** Cognos Analytics can be deployed on-premises, in the cloud, or in hybrid environments. This flexibility allows organizations to choose the deployment option that best fits their requirements and IT infrastructure.

Overall, IBM Cognos Analytics provides a comprehensive suite of tools and functionalities for data integration, modeling, analysis, and reporting, empowering users to make data-driven decisions and drive business success.



## **Installation**

### **Summary**

IBM Cognos Analytics 11.1.x installation now consists of two components: The installer file and a repository compressed file. When the installer is executed, you must point to the appropriate repository (options include server and client). For this document, we will focus on installing only the server repository.

- The server repository consists of the Cognos Analytics Server (content tier, application tier and gateway tier) and Life-Cycle Manager.
- The client repository consists of Framework Manager, Life-Cycle Manager, Cube Designer, and Dynamic Query Analyzer.

### **Objective**

If you are installing Cognos Analytics for the first time or upgrading from a previous release, this document will be your step-by step guide on how to install Cognos Analytics 11.1.x.

### **Environment**

This document was written using Cognos Analytics 11.1.1 and the install was performed on a Windows 2012 R2 server.

### **Steps**

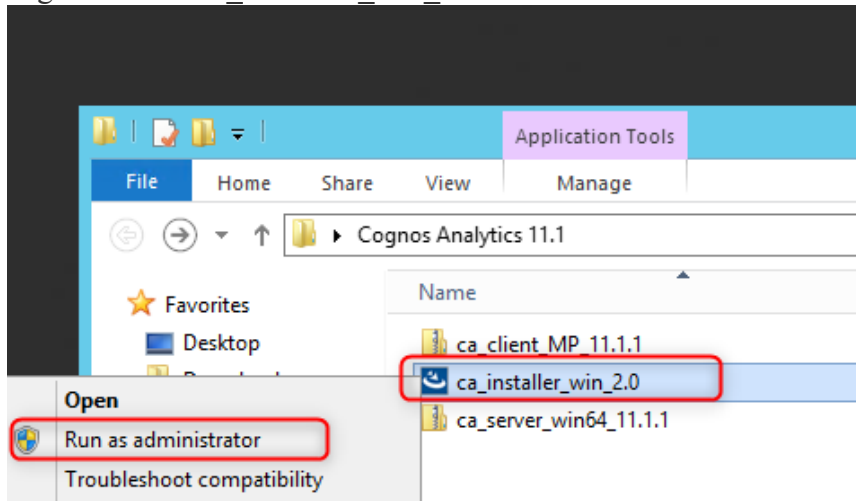
#### **Preparing to Install**

Before you install Cognos Analytics, it is recommended to review the below checklist to make your install a success:

- Review of the [IBM Software Compatibility Reports page](#)
- Minimum of 8 GB of available Disk is required for Installation (*This may vary based on components being installed*)
- Backup of your Cognos Content Store

## Installation Steps:

- Right click on **ca\_installer\_win\_2.0** and select **Run as administrator**

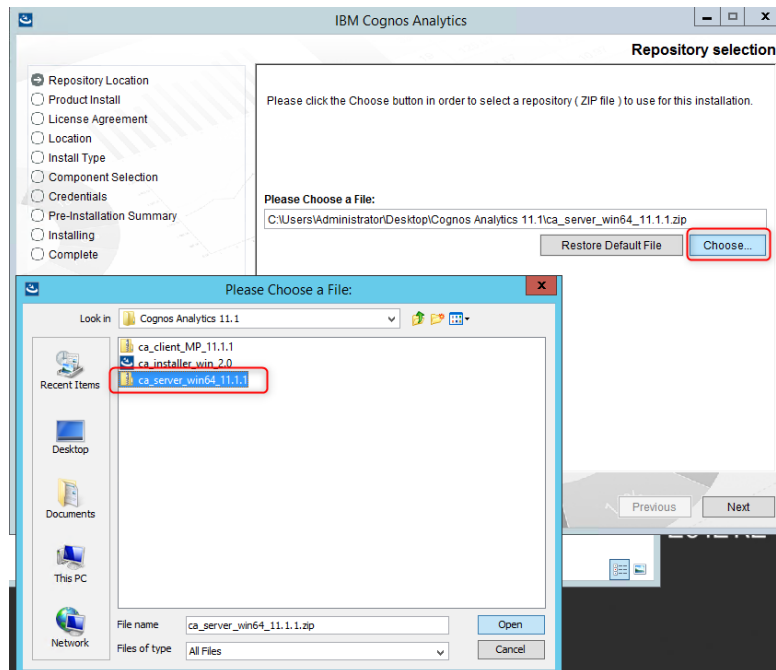


- Once the installation window loads select your desired installation language and click **Next**



The next screen is where you are required to select the repository (Server repo or Client repo). Again, the server repository consists of the Cognos Analytics Server (content tier, application tier and gateway tier) and Life-Cycle Manager and the client repository consists of Framework Manager, Life-Cycle Manager, Cube Designer, and Dynamic Query Analyzer.

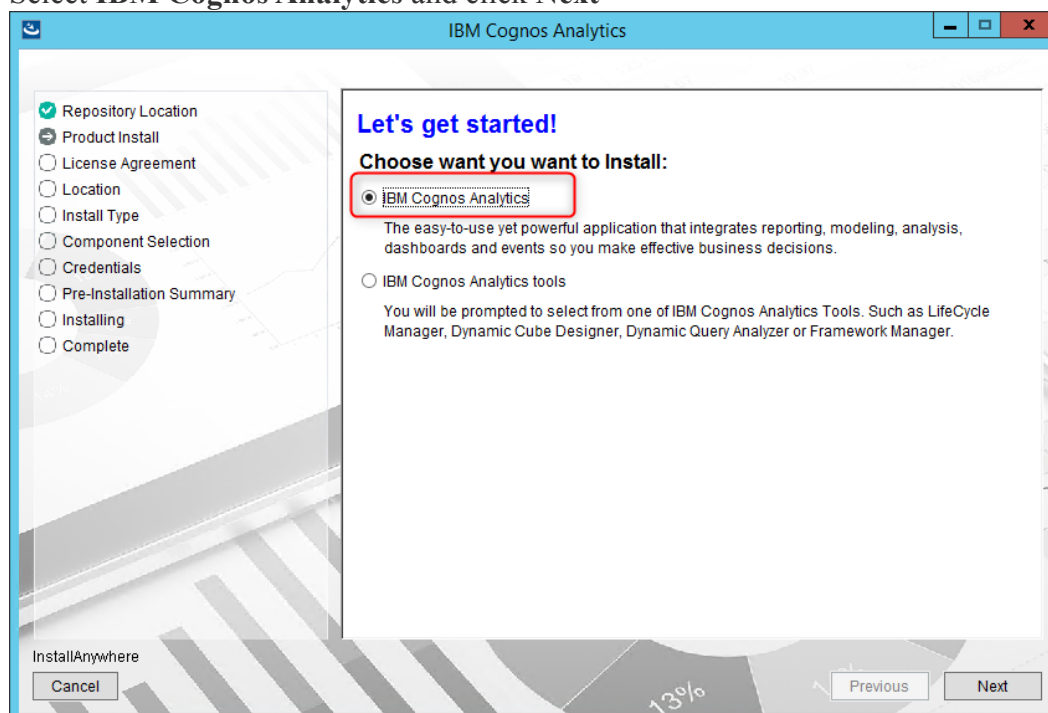
- Click **Choose** and browse to the server repo (compressed file) and click **Open** and then **Next**



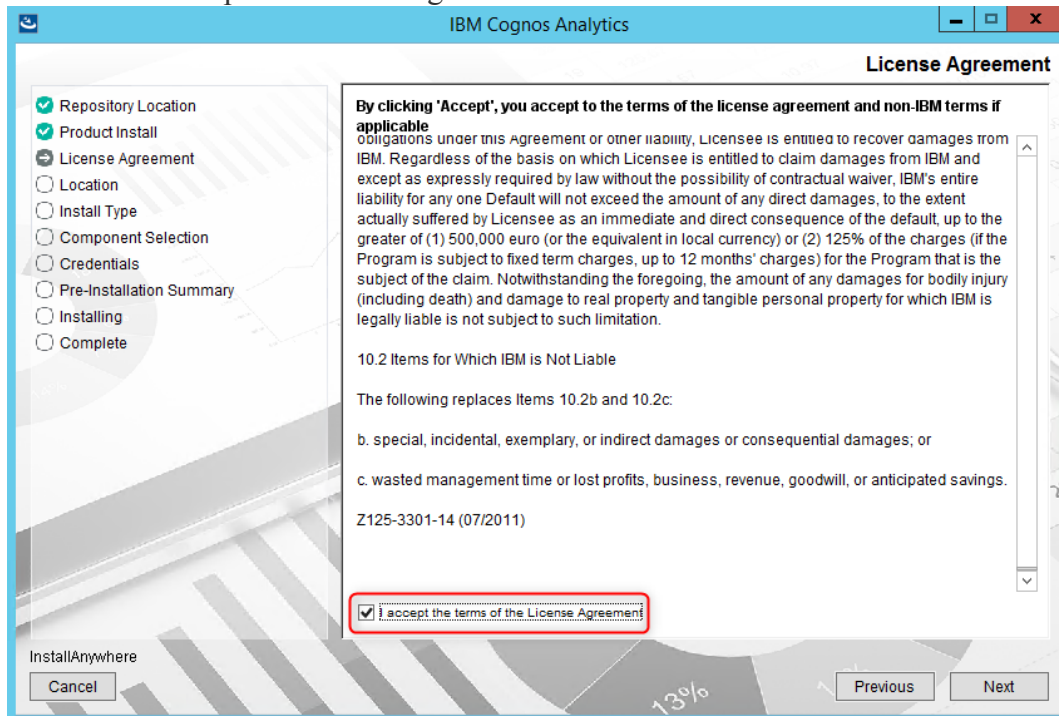
Next, you have the option to install IBM Cognos Analytics (server) or IBM Cognos Analytics tools (Life-cycle manager)

*(To install Framework Manager and other client tools, you will need to use the client repository)*

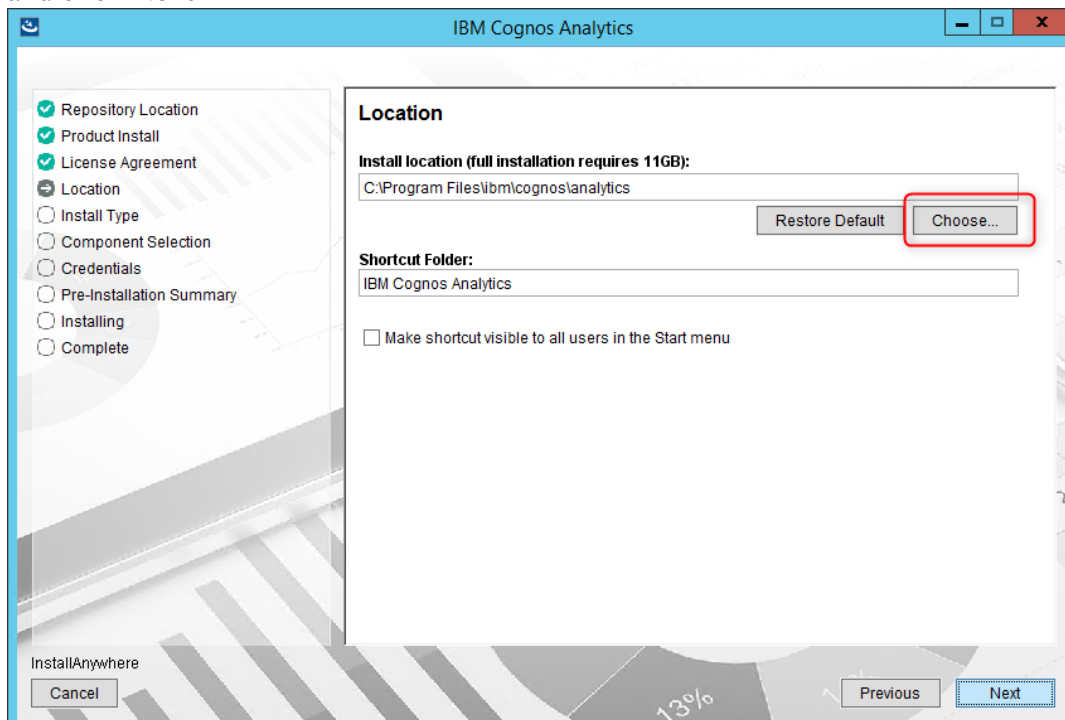
- Select **IBM Cognos Analytics** and click **Next**



- Review and accept the licenses agreement and click **Next**

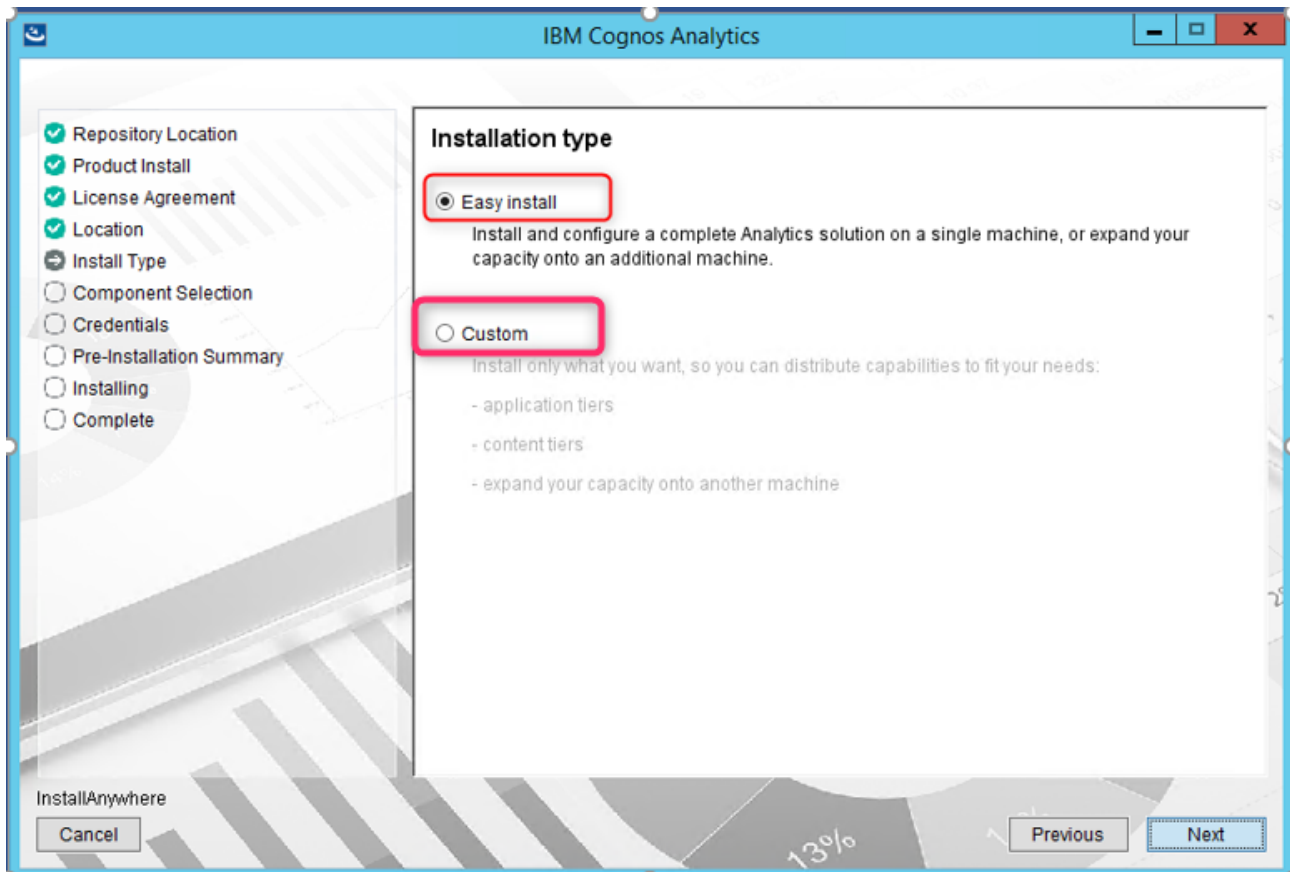


- Choose the location where you would like the Cognos Analytics application to be installed and click **Next**



If you are doing an over-the-top install skip to [Perform an Over The Top Install](#) section of this document

If this is a new install and not over the top you will have the option to select from an Easy Install or Custom



### Easy Install

This install option is intended to help you get up and running with IBM Cognos Analytics in no time, without any additional configuration and without the need to install any supporting software. You can use this option on Windows operating systems only, and you can perform only one Easy install on a computer.

With this install option, you get the following components with all the configuration already in place:

- A full version of IBM Cognos Analytics software with all the new capabilities.
- Informix 12.10 installed and configured for use as a content store database.
- Apache Directory Server to create and manage users.
- Cognos Analytics samples (base samples only).

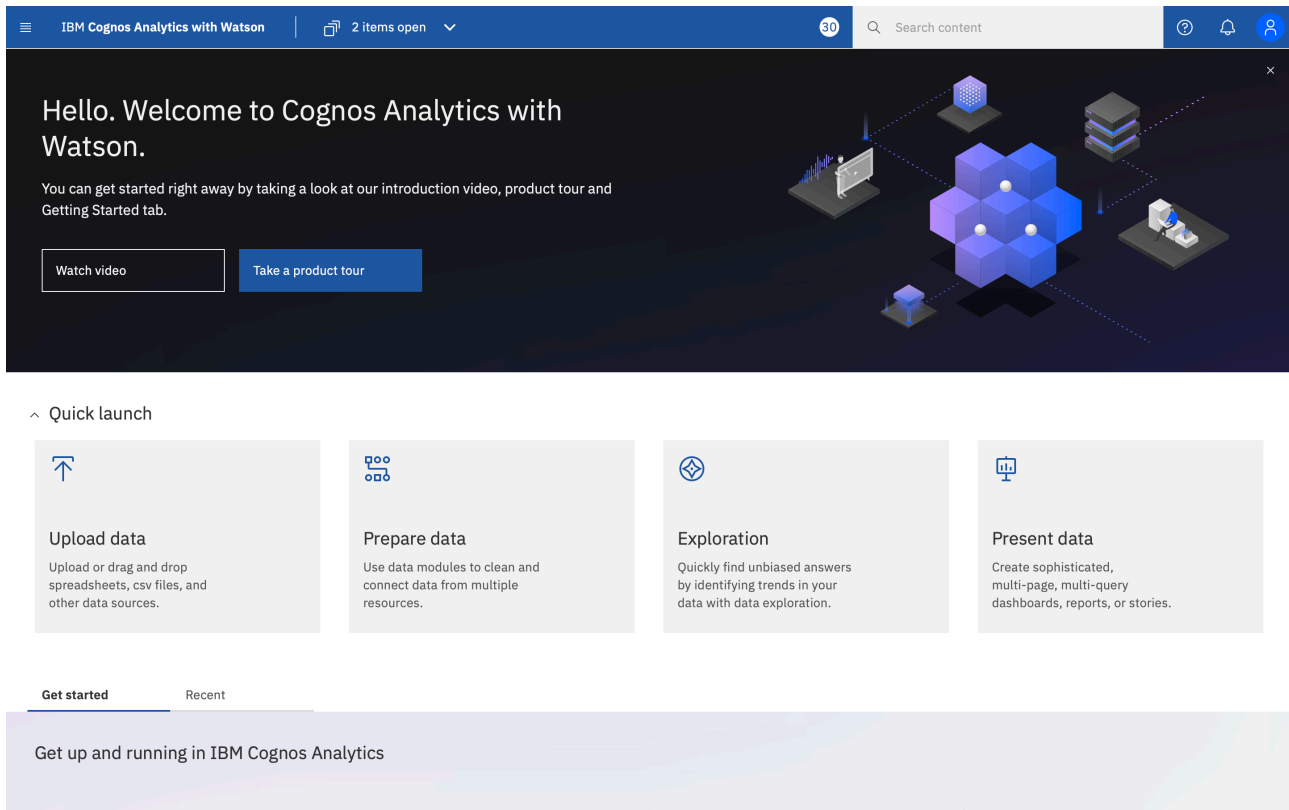
### Custom Install

The custom install provides you with the full flexibility to pick and choose the IBM Cognos Analytics components that you want to install. This is the option you would want to select if you want to customize or integrate IBM Cognos Analytics with third-party software. This is the preferred install for a Production environment



## Sample Execution

### Dashboard:



### Dataset:

We have considered dataset of Netflix from Kaggle. Thus with help of IBM Cognos Analytics we are gonna have an overall look at the Financial forecasting of its revenue and subscribers based on certain factors like - Area and Years.

The following are the links to the respective datasets:

- [Data Netflix Revenue](#)
- [Data Netflix Subscribers](#)

## Data Netflix Revenue:

This file "DataNetflixRevenue2020\_V2.csv" contains three columns. Each row corresponds to Netflix's revenue by region.

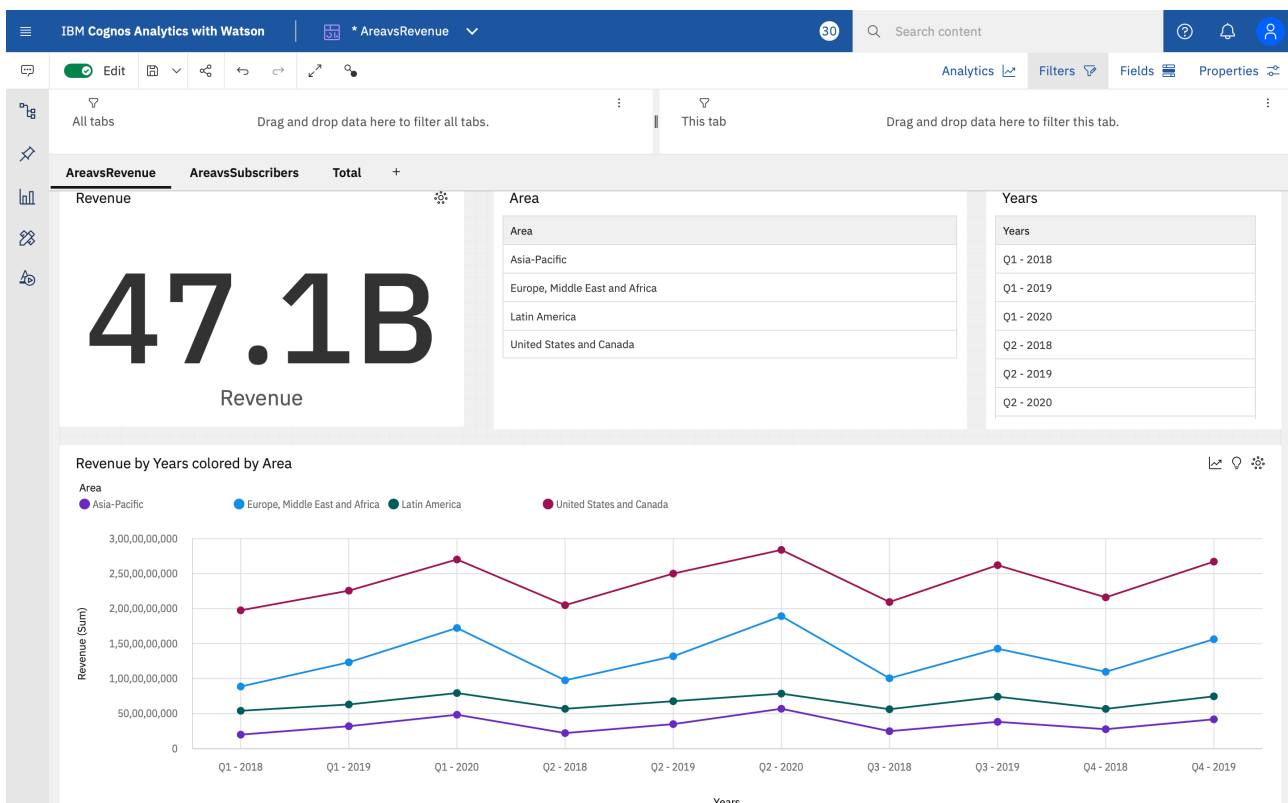
- Area
- Years
- Revenue

## Data Netflix Subscriber:

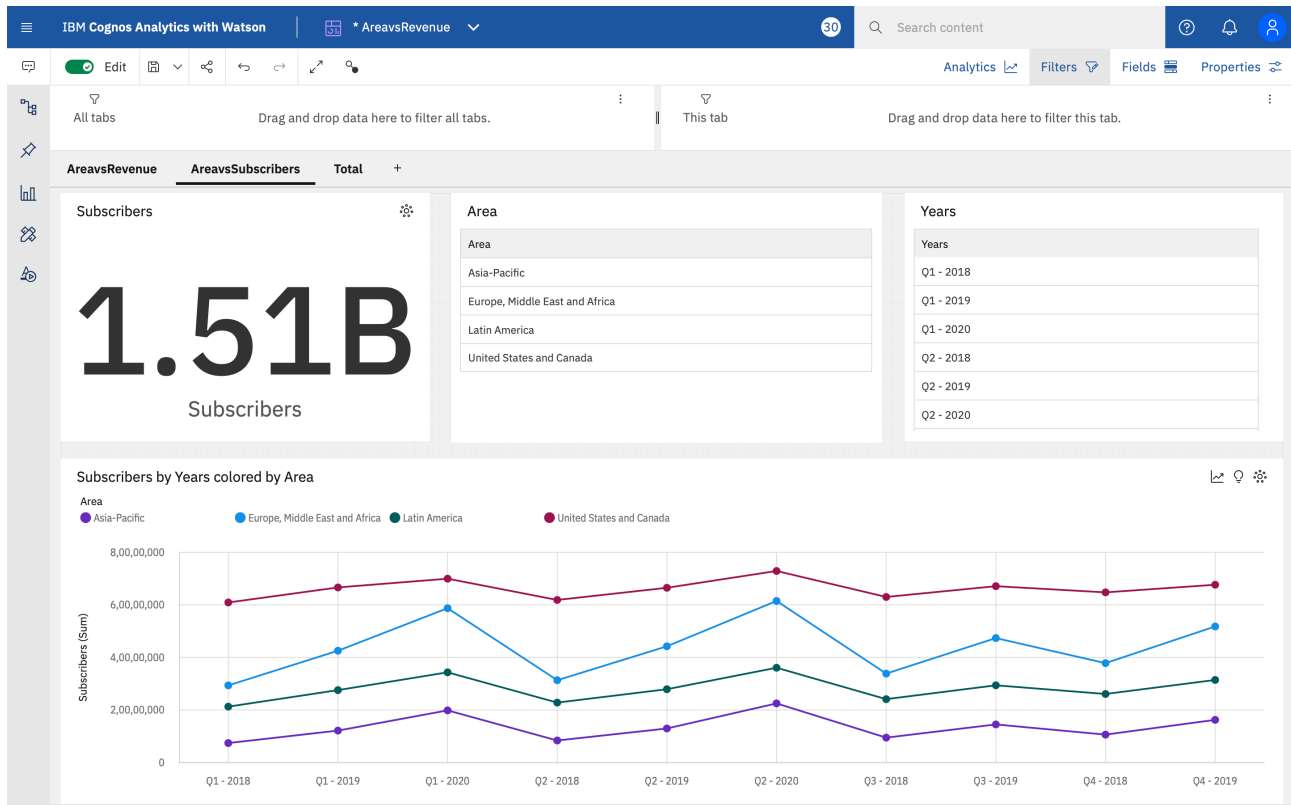
This file "DataNetflixSubscriber2020\_V2.csv" contains three columns. Each row corresponds to Netflix's Subscribers by region.

- Area
- Years
- Subscribers

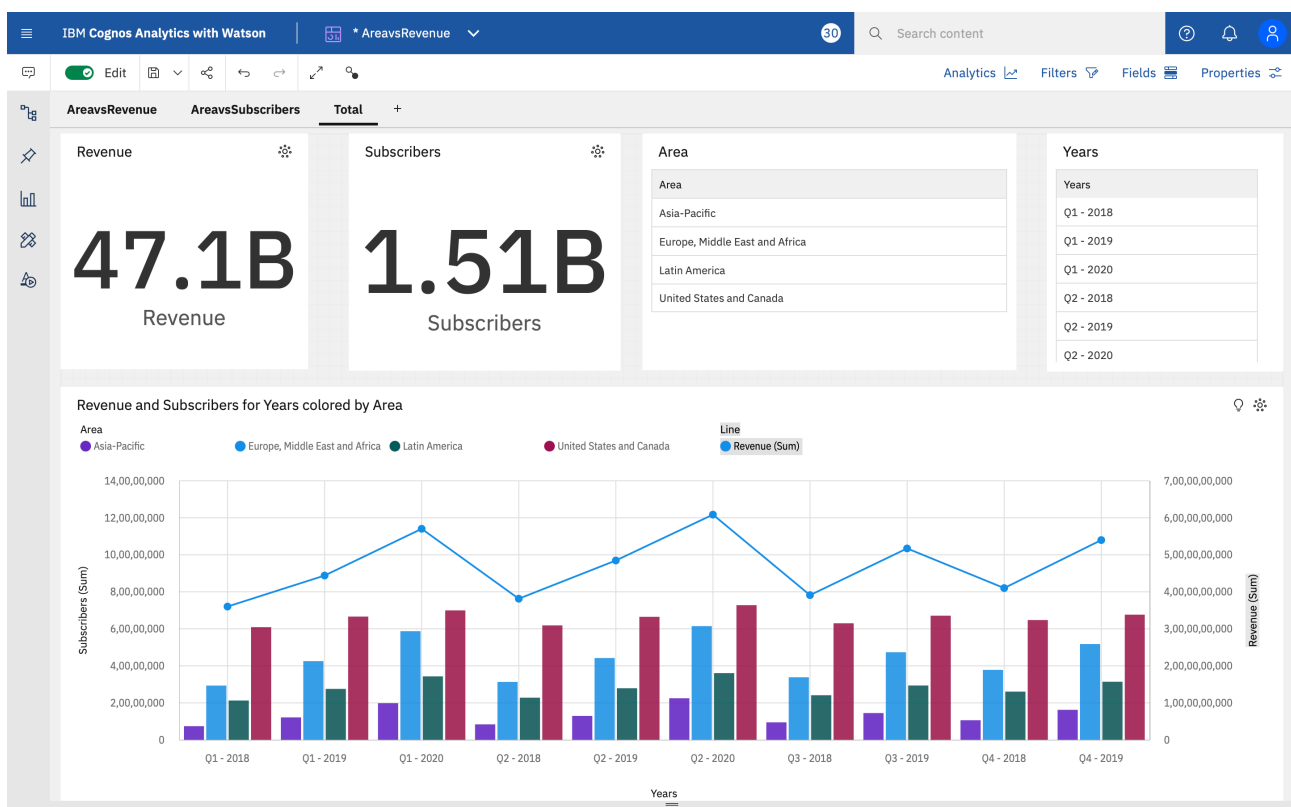
## Analysis Based on Data Netflix Revenue:



## Analysis Based on Data Netflix Subscribers:



## Analysis Based on Data Netflix Revenue and Subscribers:



## Outcome of the Demo

### Analysis Based on Data Netflix Revenue:

- **Revenue** is unusually high when **Area** is **United States and Canada**.
- Over all years and areas, the sum of Revenue is approximately 47 billion.
- The summed values of **Revenue** range from **over 199 million** to **over 2.8 billion**.
- For **Revenue**, the most significant value of **Area** is **United States and Canada**, whose respective **Revenue** values add up to **approximately 24 billion**, or **50.7 %** of the total.
- For **Revenue**, the most significant value of **Years** is **Q2 - 2020**, whose respective **Revenue** values add up to **nearly 6.1 billion**, or **12.9 %** of the total.

### Analysis Based on Data Netflix Subscribers:

- **Subscribers** is unusually high when **Area** is **United States and Canada**.
- Across all years and areas, the sum of Subscribers is over 1.5 billion.
- The summed values of **Subscribers** range from **almost 7.4 million** to **nearly 73 million**.
- For **Subscribers**, the most significant value of **Area** is **United States and Canada**, whose respective **Subscribers** values add up to **over 661 million**, or **43.7 %** of the total.
- For **Subscribers**, the most significant values of **Years** are **Q2 - 2020** and **Q1 - 2020**, whose respective **Subscribers** values add up to **almost 376 million**, or **24.8 %** of the total.

### Analysis Based on Data Netflix Revenue and Subscribers:

- **Revenue** and **Subscribers** is unusually high when **Area** is **United States and Canada**.
- For **Revenue and Subscribers**, the most significant value of **Area** is **United States and Canada**, whose respective **Revenue** values add up to **approximately 24 billion**, or **50.7 %** of the total and **Subscribers** values add up to **over 661 million**, or **43.7 %** of the total.
- Thus making an impact in analyzing the data by joining the dataset of Revenue and Subscribers of Netflix.

## Outcome of the Study

**IBM Cognos Analytics** is a business intelligence and data analytics platform offered by IBM. The platform provides a range of capabilities for data exploration, reporting, dashboarding, and advanced analytics. Here are some of the potential outcomes that organizations can achieve by using IBM Cognos Analytics:

1. **Data-driven decision-making:** IBM Cognos Analytics enables organizations to access and analyze their data to make informed decisions. Users can explore data from various sources, perform ad-hoc analysis, and create interactive dashboards and reports. By leveraging the platform's capabilities, organizations can enhance their decision-making processes and improve business outcomes.
2. **Improved reporting and visualization:** IBM Cognos Analytics offers robust reporting and visualization features. Users can create professional-looking reports and interactive visualizations to present data in a meaningful and understandable manner. This helps stakeholders gain insights quickly and facilitates effective communication of key information within the organization.
3. **Self-service analytics:** The platform emphasizes self-service analytics, allowing business users to access and analyze data without heavy reliance on IT or data specialists. With intuitive interfaces and drag-and-drop functionality, users can explore data, create visualizations, and generate reports without extensive technical knowledge. This promotes a data-driven culture within organizations and empowers users to gain insights on their own.
4. **Advanced analytics capabilities:** IBM Cognos Analytics integrates with advanced analytics tools and techniques, such as predictive modeling, data mining, and statistical analysis. Organizations can leverage these capabilities to uncover patterns, identify trends, and make predictions using historical data. This empowers users to perform advanced analytics tasks within the same platform, eliminating the need for additional tools or systems.
5. **Enhanced collaboration and sharing:** IBM Cognos Analytics provides collaboration features that facilitate sharing and collaboration among users. Teams can collaborate on reports, dashboards, and analysis, enabling knowledge sharing and fostering a collaborative environment. This ensures that insights and information are shared across the organization, leading to better-informed decisions.
6. **Mobile and real-time analytics:** IBM Cognos Analytics offers mobile capabilities, allowing users to access and interact with data on various devices. This enables decision-makers to stay connected and make informed decisions on the go. Additionally, the platform supports real-time data integration and analysis, enabling organizations to monitor key metrics and make timely decisions based on up-to-date information.
7. **Governance and security:** IBM Cognos Analytics incorporates governance and security features to ensure data integrity, privacy, and compliance. Organizations can define and enforce data access controls, implement data governance policies, and track data lineage. This helps maintain data quality, protect sensitive information, and meet regulatory requirements.

The outcome of using IBM Cognos Analytics is an enhanced ability to explore and analyze data, gain actionable insights, and empower business users to make informed decisions. The platform supports a collaborative and self-service analytics environment, facilitating a data-driven culture and improving overall business performance.

## How it is Better?

**IBM Cognos Analytics** offers several advantages compared to other analytics tools in the market. Here are some key points that highlight its strengths:

1. **Comprehensive and Integrated Platform:** IBM Cognos Analytics provides a complete and integrated platform for analytics, covering a wide range of functionalities such as data exploration, visualization, reporting, dashboarding, and predictive analytics. This integrated approach eliminates the need for multiple tools and allows users to perform end-to-end analytics within a single platform.
2. **Advanced Analytics Capabilities:** Cognos Analytics goes beyond basic reporting and visualization by offering advanced analytics capabilities. Users can leverage features like data modeling, statistical analysis, data mining, and predictive modeling to uncover valuable insights and make data-driven decisions.
3. **Self-Service and User-Friendly Interface:** Cognos Analytics emphasizes self-service analytics, empowering business users to create their own reports and dashboards without heavy reliance on IT or data experts. The platform provides an intuitive and user-friendly interface with drag-and-drop functionality, interactive visualizations, and guided data exploration, making it accessible to users with varying technical skill levels.
4. **Robust Collaboration and Sharing:** Collaboration is a crucial aspect of analytics, and Cognos Analytics excels in this area. It enables users to share reports, dashboards, and insights with others in their organization, fostering collaboration and facilitating informed decision-making across teams. Users can also leave comments, annotations, and discussions within the platform to enhance collaboration and knowledge sharing.
5. **Enterprise-Grade Security and Governance:** IBM Cognos Analytics prioritizes data security and governance, ensuring that sensitive information is protected and regulatory requirements are met. It offers robust security features, including role-based access control, data encryption, and integration with existing authentication systems. Additionally, the platform enables administrators to define data access policies, audit activities, and track user actions to maintain control and compliance.
6. **Scalability and Integration:** Cognos Analytics is designed to scale and handle large volumes of data, making it suitable for enterprise-level deployments. It integrates with a variety of data sources, including databases, cloud storage, spreadsheets, and enterprise applications, enabling organizations to leverage their existing data infrastructure. Integration with other IBM products, such as IBM Watson AI services and IBM SPSS, further enhances its capabilities.
7. **Continuous Innovation and Support:** IBM is a well-established technology company with a strong commitment to innovation. Cognos Analytics benefits from continuous updates, enhancements, and new features that keep it aligned with emerging trends and customer needs. IBM also provides comprehensive technical support, training resources, and a vibrant user community to assist users in getting the most out of the tool.

It's important to note that the effectiveness of any analytics tool depends on specific business requirements and user preferences. It's recommended to evaluate multiple tools, considering factors such as cost, features, scalability, and ease of integration before making a decision.

## References

- <https://www.ibm.com/products/cognos-analytics>
- <https://www.ibm.com/in-en>
- <https://www.kaggle.com/>
- <https://www.youtube.com/>