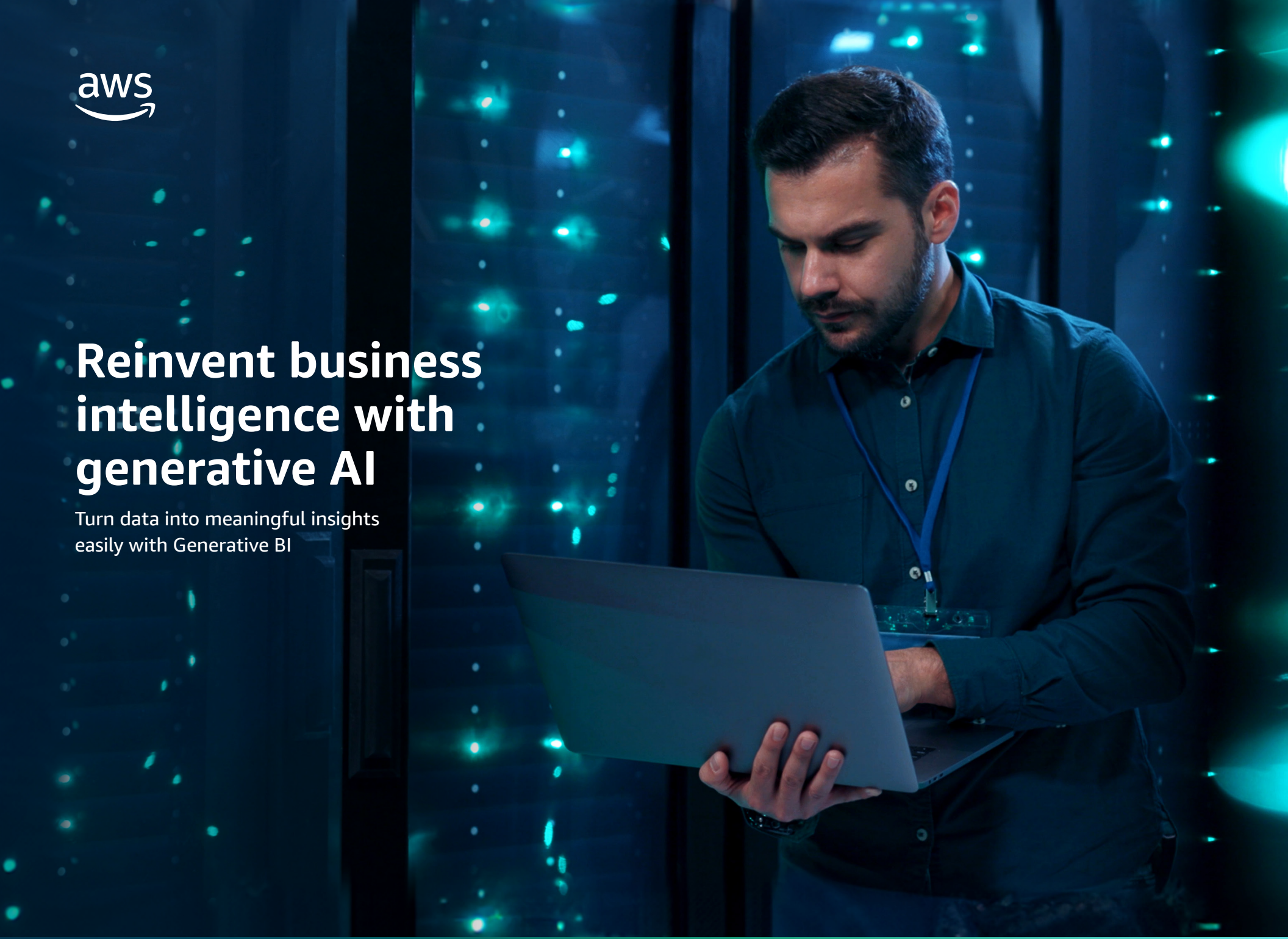

Reinvent business intelligence with generative AI

Turn data into meaningful insights easily with Generative BI

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INTRODUCTION

Data-driven organizations and the pace of business today

In today's fast-paced business landscape, organizations are under immense pressure to make data-driven decisions quickly and effectively. The ability to extract insights from data and translate them into actionable strategies has become a crucial competitive advantage. However, as data volumes continue to grow exponentially, traditional business intelligence (BI) tools and methods struggle to keep up. These tools are falling short not only because of the high volume of data but also because of the complex and ever-changing nature of data. The challenge of integrating data from disparate systems, legacy platforms, and different data structures is a major hurdle for data consolidation and obtaining relevant insights.

Additionally, with users of varying skill levels consuming data and insights, there's a pressing need for generative, low-effort, and low-barrier BI solutions. Analysts and business users often find themselves overwhelmed by the amount of data available, making it challenging to uncover the insights they need to drive their organizations forward. But getting insights is no longer enough; they need to be able to prioritize the actions those insights are telling them based on business impact.

Brief overview of traditional BI and its limitations

Traditional BI systems have played a vital role in helping organizations analyze and derive insights from their data. However, the analysis process in traditional BI heavily relies on manual efforts, such as data extraction, transformation, and interpretation, from data analysts. This manual process can be time-consuming and error-prone, often taking weeks to complete.

Moreover, data silos and compartmentalized information across different departments and systems make it challenging to gain a comprehensive, organization-wide view. As a consequence, organizations often struggle to keep pace with the ever-increasing volume and complexity of data, leading to delays in decision making and missed opportunities for growth and optimization.

The need for Generative BI in modern data-driven organizations

Generative BI empowers organizations to gain faster and more personalized insights from their data. This innovative approach streamlines the analysis process, reduces manual effort, and breaks down data silos, so organizations can compete in an ever-evolving data landscape. Business users can now generate narratives, visualizations, and analysis using natural language, reducing the reliance on traditional BI processes where analysts are required to build something for the user.

Additionally, Generative BI allows users to interact with data using natural language queries, facilitating more intuitive data exploration and helping organizations to stay ahead of the curve and to make informed decisions no matter the complexity or volume of data. The ability to generate personalized and contextual insights tailored to individual user needs ensures that decision makers receive the most relevant information, helping them focus on strategic priorities and drive better business outcomes.

CHAPTER 1

Understanding Generative BI

To start, we need to understand what generative AI is. Generative AI can create new content and ideas, including conversations, stories, images, videos, and music. AI technologies attempt to mimic human intelligence in nontraditional computing tasks, such as image recognition, natural language processing (NLP), and translation. Generative AI is the next step in artificial intelligence. It can be trained to learn human languages, programming languages, art, chemistry, biology, or any complex subject matter. It reuses training data to solve new problems.

What is Generative BI? Generative BI is a groundbreaking approach that applies generative AI and NLP to BI. At its core, NLP and AI technologies work with machine learning to create intelligent applications that allow for seamless communication between humans and machines. NLP converts text or speech into structured data that machines can comprehend.

The innovative application of generative AI to BI helps users engage with data using natural language, empowering them to generate insights, narratives, visualizations, and recommendations, in addition to exploring data through intuitive questioning and interaction. Generative BI uses large language models and advanced machine learning algorithms to understand user queries, retrieve relevant data, and generate human-readable insights and visualizations, helping reduce repetitive tasks, such as data exploration, report generation, and predictive analytics, and freeing up analysts and decision makers to focus on higher-level, strategic activities.

Generative BI can also enhance data storytelling by allowing users to generate compelling narratives and presentations that effectively communicate key findings and recommendations to stakeholders. By using the power of natural language generation, these models can convey complex data insights in a clear, concise, and visually appealing manner, facilitating better understanding and decision making. With Generative BI, organizations can democratize data access, augment human expertise, and accelerate time to insights—ultimately driving more informed, data-driven decision making across various industries and use cases.

Key benefits of Generative BI include:

- **Democratized access to insights:** Generative BI removes technical barriers, empowering business users and decision makers to self-serve and directly interact with their data to extract key insights.

- **Accelerated time to insights:** By simplifying data exploration and insight generation, Generative BI significantly reduces the time required to uncover valuable insights, speeding up decision making.

- **Enhanced data literacy:** Generative BI helps users develop a better understanding of their data with the use of natural language. Users can interact and extract insights from data through a Q&A process, fostering data literacy across the organization without the need for specialized training.

- **Increased productivity:** By removing repetitive tasks and streamlining data analysis processes, Generative BI frees up valuable time for analysts and data professionals to focus on more strategic initiatives.

Bringing together the power of **Amazon QuickSight** and the generative AI capabilities of **Amazon Bedrock**, **Amazon Q in QuickSight** delivers Generative BI to enhance business productivity and accelerate decision making.

Some of the key capabilities of using Generative BI with Amazon QuickSight include:

- **Data storytelling:** With Amazon Q in QuickSight, users can generate compelling narratives, presentations, and stories from data. Users can combine insights, visualizations, and natural language explanations to create engaging and understandable presentations that are completely customizable. This capability helps effectively communicate complex data patterns and findings to stakeholders, making it easier to convey the why behind the numbers.

- **AI-powered Q&A interaction:** Amazon Q in QuickSight offers an AI-powered Q&A interface, which allows users to ask questions of their data using natural language—without complex SQL queries or data manipulation. Users can then refine their queries, ask follow-up questions, and engage with the system in a more natural, intuitive way.

- **Insight generation:** Amazon Q in QuickSight can identify patterns, trends, and anomalies in data, surfacing key insights without the need for manual exploration.

- **Dynamic visualization:** Based on the user's query and the data context, Amazon Q in QuickSight can generate appropriate visualizations, such as charts, graphs, and dashboards, to effectively communicate insights.

- **Predictive analytics:** By using machine learning models, Amazon Q in QuickSight can provide predictive insights and forecasts, so users can make more informed decisions about future outcomes.

- **Scalability and cost-efficiency:** As a cloud-based service, Amazon Q in QuickSight can scale seamlessly to handle increasing data volumes and user demands cost effectively.

- **Security and data governance:** Amazon Q in QuickSight is not trained on customer data, and its governance and data security features meet the most stringent requirements for enterprise and government customers.

CHAPTER 2

Use cases and applications of Generative BI

Generative BI has transformative potential across various industries and scenarios. The following use cases demonstrate how Generative BI with Amazon Q in QuickSight can streamline workflows, enhance data exploration, and provide more effective communication of insights—from automating report generation and presentation creation to facilitating interactive data analysis and building dashboards rapidly.

USE CASE

Report generation and storytelling

USE CASE

Data exploration and analysis

USE CASE

Dashboard creation in minutes vs. hours

USE CASE

Report generation and storytelling

Scenario: A marketing agency wants to provide its clients with comprehensive campaign performance reports and data-driven insights to inform future marketing strategies. The agency uses the Generative BI capabilities of Amazon Q in QuickSight to streamline report generation and enhance data storytelling.

Document creation using natural language: After each campaign, the agency's data analyst initiates the process with a click of the data story capability in Amazon Q in QuickSight to generate a detailed performance document for the recent social media campaign, including key metrics, visualizations, and insights.

Amazon Q analyzes the campaign data, including metrics, such as reach, engagement, conversion rates, and ad performance. It generates a comprehensive document with visualizations, charts, and narratives either in a scrollable page or slide deck that explains the campaign's performance in a clear and concise manner.

For example, the document might include a section that states that the social media campaign achieved a 20 percent increase in website traffic compared to the previous quarter, driven by highly engaging video content and influencer partnerships. However, conversion rates from social channels remained below the targeted benchmark, indicating opportunities for optimization in the landing page experiences and retargeting strategies.

Contextual and personalized reporting: Recognizing that each client has unique goals and priorities, the agency can completely customize the document, tailoring it to individual client needs. The agency can add in different visuals to show and summarize the data or customize text, bolding important sections and callouts and ensuring that clients receive relevant and actionable insights based on their specific objectives.

Data-driven presentations: As the agency prepares to present the campaign performance to the client, the analyst can also create a slide deck, asking Amazon Q to create a compelling presentation that tells a cohesive story about the campaign's performance, key learnings, and recommendations for future strategies.

With data stories in Amazon Q in QuickSight, the agency generates a visually appealing slide deck, combining data visualizations, narratives, and clear storytelling elements. The slide deck might start by setting the context, outlining the campaign objectives and target audience, followed by a data-driven analysis of the performance metrics and insights. The presentation concludes with actionable recommendations and a clear call to action, backed by data-driven insights and visualizations.

By using Generative BI capabilities of Amazon Q in QuickSight for data storytelling, the marketing agency can provide its clients with comprehensive, tailored, and visually compelling campaign performance reports. This not only saves time and effort but also creates more effective communication of insights and fosters a deeper understanding of the data, ultimately driving better-informed marketing strategies.

USE CASE

Data exploration and analysis

Scenario: A financial services company wants to explore its customer data to identify potential cross-selling and upselling opportunities. A business professional at the company uses the Generative BI capabilities of Amazon Q in QuickSight for data Q&A and executive summaries to conduct a comprehensive data exploration and uncover valuable insights.

Generating natural language queries and summaries: The business professional initiates the exploration by asking to "show top customers" in natural language to the data Q&A capability in Amazon Q in QuickSight. Amazon Q processes the customer data, including demographics, purchase histories, and product usage patterns. Amazon Q generates a view of high-value customers by age group, income level, and preferred products or services.

Identifying patterns and anomalies: Building on the initial query, the business professional asks the Q&A if there are notable patterns or anomalies in the behavior of those high-value customers that should be investigated further. Amazon Q analyzes the data and generates visualizations, highlighting potential patterns or outliers.

For instance, Amazon Q might identify an untapped opportunity in a cluster of individuals with high net worths in a specific region who have yet to adopt the company's premium services. Additionally, Amazon Q could detect anomalies, such as a sudden drop in engagement or transactions for a particular customer segment, warranting further investigation.

Intrigued by the initial findings, the business professional engages the executive summary capability in Amazon Q in QuickSight. They ask, "Show me the distribution of product adoption across different age groups and income levels," or "Why did the number of new customers increase so much in Q1 this year?"

Amazon Q responds by generating an executive summary, allowing the business professional to focus on specific segments and uncover deeper insights. For example, the system might reveal that customers in the 25 to 35 age group with moderate incomes are highly engaged with the company's digital banking services but have yet to adopt investment products, which suggests cross-selling opportunities.

Throughout the exploration process, Amazon Q continues to provide natural language explanations and insights, guiding the professional toward relevant findings and potential opportunities.

By using the Generative BI capabilities of Amazon Q in QuickSight, users in the financial services company can use natural language for data exploration to gain a deeper understanding of its customer base, uncover hidden opportunities, and develop data-driven strategies to drive cross-selling and upselling initiatives effectively.

USE CASE

Dashboard creation in minutes vs. hours

Scenario: Leadership requests a dashboard in a specific layout that monitors and reports on product performance. An analyst needs to prepare this dashboard quickly, so it's ready to present to leadership for the monthly performance review meeting.

Creating a visualization and designing a dashboard: The analyst initiates a natural language request in Amazon Q in QuickSight to build a visual, such as "most profitable product." In seconds, the system generates the appropriate visual; and in minutes, the analyst can use a natural language prompt to create any variety of visuals needed to build a dashboard.

Refining and formatting visuals: To refine the visuals, the analyst provides natural language instructions, such as, "change layout to a table and the color from light orange to dark blue." Amazon Q then updates the visualizations, layouts, and insights based on the new requirements in seconds, without the need to start from the beginning.

By using the Generative BI authoring capabilities of Amazon Q in QuickSight, the analyst can streamline the entire dashboard-building process, helping them to deliver an insightful dashboard rapidly and allowing data-driven decision making across various aspects of operations, such as production planning, inventory management, and customer fulfillment. Amazon Q not only helps increase efficiency but can also foster better collaboration and agility, allowing organizations to adapt to dynamic business environments more effectively.

CHAPTER 3

Security and data insights with the Generative BI capabilities of Amazon Q in QuickSight

Amazon Q in QuickSight empowers users across all levels of an organization, from business executives to frontline employees, to gain valuable insights from data without the need for specialized BI training. Amazon QuickSight prioritizes governance, security, and user data, verifying that organizations can use the power of Generative BI while maintaining control over their data and adhering to the most stringent enterprise and government needs.

Key features and considerations include:

- **Strong data access controls:** Amazon QuickSight helps organizations to define granular access controls, verifying that users can only access and interact with data they are authorized to view.

- **Data encryption:** Data stored and processed within Amazon QuickSight is encrypted at rest and in transit, providing an additional layer of security.

- **Compliance standards and certifications:** Amazon QuickSight adheres to a comprehensive set of security features, including role-based access controls (RBACs), Microsoft Active Directory integration, Amazon Web Services CloudTrail (AWS CloudTrail) auditing, single sign-on (such as AWS Identity and Access Management [IAM] and third parties), Amazon Virtual Private Cloud (Amazon VPC) subnets, and data backup. QuickSight is also Federal Risk and Authorization Management Program (FedRAMP), Health Insurance Portability and Accountability Act (HIPAA), Payment Card Industry Data Security Standard (PCI DSS), International Organization for Standardization (ISO), and Service Organization Controls (SOC) eligible to help you meet industry-specific or regulatory requirements.

- **User audit trails:** Detailed audit logs are maintained, allowing organizations to track and monitor user activities and verifying accountability and proactive incident response.

- **Existing security frameworks integration:** Amazon QuickSight seamlessly integrates with existing security frameworks and identity providers, allowing for centralized user management and access control.

Connect to data sources: Amazon QuickSight offers seamless integration with a wide array of data sources, empowering organizations to unlock valuable insights from their data. Whether data resides in AWS services, such as **Amazon Athena**, **Amazon Redshift**, or **Amazon Simple Storage Service (Amazon S3)**; third-party platforms like Salesforce or Marketo; or on-premises databases, QuickSight provides a unified service to connect, analyze, and visualize data. With its support for popular file formats like comma-separated value (CSV), Excel, and JavaScript Object Notation (JSON) and custom data sources through Java Database Connectivity (JDBC) and Open Database Connectivity (ODBC) connections, QuickSight ensures that data can be incorporated from virtually any source.

Additionally, **AWS Data Exchange** facilitates the discovery and subscription to third-party data sets, further expanding the possibilities for data-driven decision making within an organization. This comprehensive data connectivity, combined with QuickSight's powerful analytics and visualization capabilities, helps businesses gain a holistic understanding of their data landscape and drive informed strategic decisions.

Allow users to gain insights from past and current data and models to predict future outcomes: QuickSight uses a high-performance analytics engine called SPICE (super-fast, parallel, in-memory calculation engine). SPICE can automatically ingest data from various sources, including current operational data sources, and store it in an optimized in-memory cache. This helps QuickSight perform fast, one-time analysis and data visualization on large, up-to-date operational datasets, providing users with insights from historical and current data. In addition to analyzing past and present data, QuickSight also helps users predict analytics using machine learning models. Data scientists can build predictive models using QuickSight data and then deploy the models within the AWS cloud environment.

The QuickSight integration with **Amazon SageMaker Canvas** activates advanced forecasting and predictive modeling capabilities. This integration helps with:

- **Predictive analytics:** QuickSight users can use prebuilt machine learning models to perform predictive analytics on their data. These models can identify patterns, trends, and relationships, so users can make informed decisions about future outcomes based on historical data.

- **Advanced forecasting:** Taking advantage of the advanced forecasting capabilities of SageMaker Canvas, users can generate accurate forecasts for their data. This feature removes the need for manual model building and tuning, helping nontechnical users create reliable forecasts.

- **Custom model building:** For more advanced use cases, QuickSight users can build and train custom machine learning models using the no-code interface of SageMaker Canvas. These models can then be seamlessly integrated into QuickSight for predictive analytics and forecasting.

By combining the powerful data visualization and analysis capabilities of QuickSight with the advanced machine learning and forecasting features of SageMaker Canvas, users can gain even more comprehensive insights from their data. This integration empowers organizations to make data-driven decisions not only based on historical and current data but also by using predictive models to anticipate future trends and outcomes.

For example, a financial institution can use the machine learning capabilities of SageMaker Canvas to build and deploy a model that predicts potential cases of identity fraud based on customer data, transaction history, and other relevant factors. The model's predictions can then be visualized and monitored through interactive dashboards and visualizations in QuickSight.

Additionally, with the use of Amazon Q in QuickSight, Generative BI can help analysts and decision makers explore the data and uncover insights related to identity fraud by generating summaries and recommendations based on the visualized data. By continuously retraining the model with new data, updating the QuickSight dashboards, and using Generative BI, the institution can help protect their customers and make informed decisions to mitigate financial losses due to identity fraud.

CONCLUSION

In today's data-driven landscape, organizations that effectively use their data assets can gain a significant competitive advantage. The Generative BI capabilities of Amazon Q in QuickSight help businesses unlock the true potential of their data by providing a conversational, intuitive, and intelligent approach to data analysis and insight generation.

By combining the power of natural language processing, machine learning, and cloud-based scalability, Amazon Q in QuickSight democratizes data access, accelerates time to insight, and fosters data literacy across an organization. With the ability to ask questions in natural language, receive automated insights, and use predictive analytics, users at all levels can make informed decisions that drive business growth and success.

The real-world use cases explored in chapter 2 demonstrate the versatility and impact of Generative BI across diverse industries and functional areas. As organizations continue to grapple with ever-increasing data volumes and the need for faster decision making, the Generative BI capabilities of Amazon Q in QuickSight have revolutionized BI, so organizations can stay ahead of the curve and navigate the complexities of the modern data landscape.

By embracing Generative BI and using the capabilities of Amazon Q in QuickSight, organizations can unlock new levels of efficiency and agility, gaining a competitive edge and positioning themselves as true data-driven leaders in their respective markets.

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