Emerging Asia-Pacific Big Data Market Report, 2024

FROST & SULLIVAN

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October 2024

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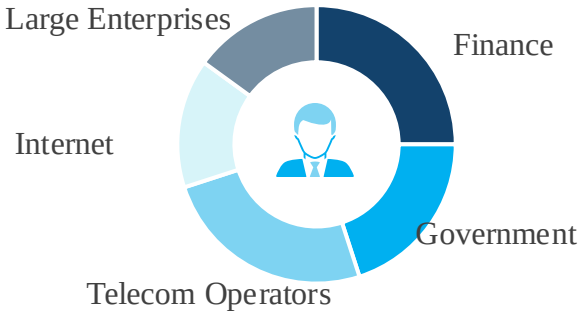
Research based on a wide sample base: Classification statistics by downstream customer industry, size, region, and cloud vendor type

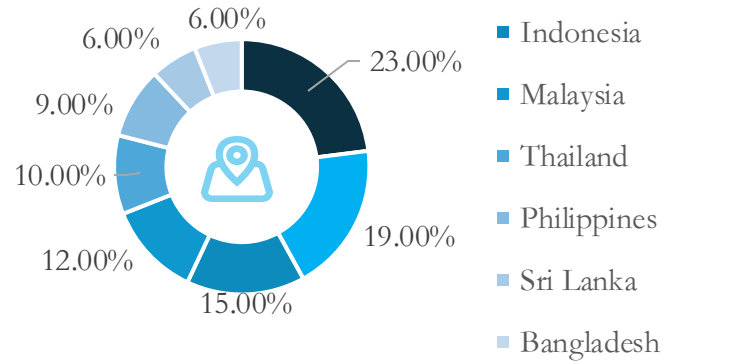
Downstream Customer Industry



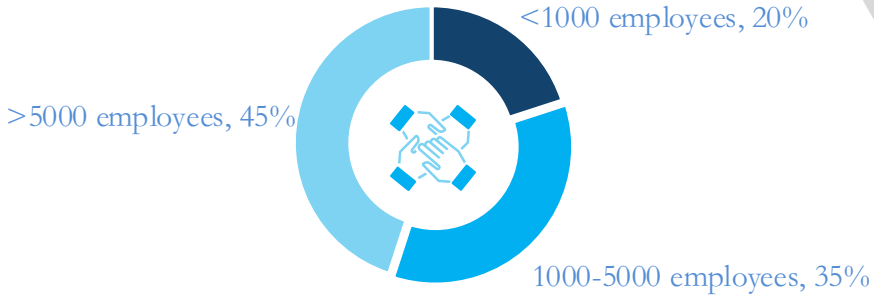
Region/Scope

Emerging Asia-Pacific Region

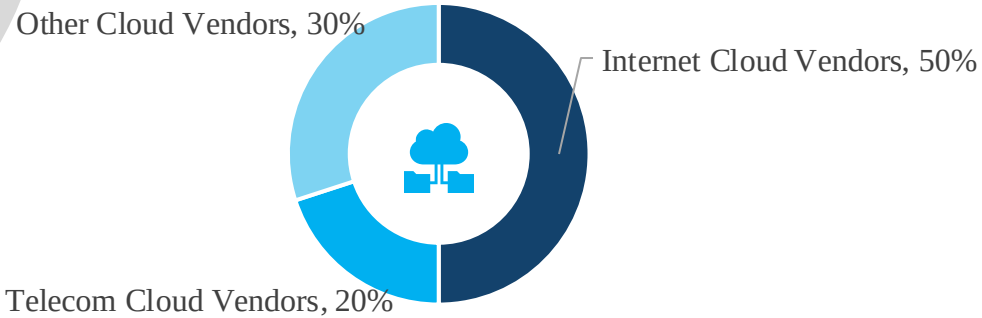
Downstream Customer Region



Downstream Customer Size



Cloud Vendor Type



Note:
This study focuses on the "Emerging Asia-Pacific Market," mainly including Hong Kong, China; the Philippines; Indonesia; Malaysia; Singapore; Thailand; Bangladesh; Sri Lanka.
The survey sample size is as follows: downstream customer survey, 30 companies; cloud vendor survey, 15 companies.

Sources: Frost & Sullivan

Contents

Macro Background: The big data market in the emerging Asia-Pacific region is in a phase of rapid expansion, showing tremendous growth potential.

Key Findings

- National policies and cross-border cooperation provide strong momentum for the big data industry in the emerging Asia-Pacific region. However, cross-border data flows and data security compliance remain major challenges for the region's development.
- Rapid economic growth and support from capital markets have boosted the application and innovation of big data technologies, but the long investment return cycle has put profitability pressure on some enterprises.
- The momentum of digital transformation among enterprises is strong, with the deep integration of cloud computing, big data, and AI technologies driving improvements in efficiency and competitiveness. However, during the process of migrating business to the cloud, complex technical challenges related to data integration, processing, and analysis, as well as privacy compliance issues, arise.

1 Policies

Advantages:

- **National Strategic Drivers:** Governments of many emerging Asia-Pacific countries are actively promoting the development of the big data industry, incorporating big data as part of national strategy. These policies primarily focus on supporting technological innovation, ensuring data security, promoting international cooperation, and cultivating professional talent, driving the application of big data technologies across various industries. For example, the Indonesian government, through the formulation of the "2023-2045 Digital Industry Development Master Plan," has collaborated with international technology companies to launch training programs specifically targeting big data analytics and data science, and established a national data center to bridge the skills gap and enhance the capabilities of digital talent.
- **Cross-border Cooperation in Big Data Technology:** Emerging Asia-Pacific countries are promoting cross-border cooperation in big data technology through regional organizations and agreements. For example, the Asia-Pacific Economic Cooperation (APEC) emphasizes the necessity of data sharing and cross-border data flow in its digital economy agenda to facilitate the integration of the regional digital economy. Additionally, ASEAN countries have strengthened cooperation in the digital sector, promoting data economy integration and creating a more open policy environment for the development of the big data industry.

Challenges:

- **Restrictions on Cross-border Data Flow:** Different countries have varying stances and regulations regarding cross-border data flow. Some countries impose strict restrictions on cross-border data transfers, which may affect the efficiency of global companies transmitting data between countries. Such restrictions can hinder the adoption of big data technologies in the Asia-Pacific market. For instance, under Malaysia's Personal Data Protection Act (PDPA), it is strictly regulated that personal data cannot be transferred abroad without approval. Cross-border data transfers are only allowed if the receiving country provides sufficient data protection or with the explicit consent of the data subject.

2 Economy & Society

Advantages

- **Rapid Expansion of the Digital Economy:** The digital economy in the emerging Asia-Pacific region is rapidly expanding, with booming digital industries such as e-commerce, fintech, and the Internet of Things (IoT), driving demand for data collection, processing, and analysis. This economic transformation provides vast development opportunities for the big data industry.
- **Demographic Dividend:** The emerging Asia-Pacific region has a large population. As of 2023, the region's population accounted for approximately 9% of the global population, roughly 720 million people. Additionally, the region has a large number of internet users and smart device users. By 2023, the internet penetration rate in the region was about 66%, an increase from 61% in 2021. Although penetration rates vary by country and region, this growth reflects the region's progress in internet usage. Consequently, with the increasing internet penetration and widespread use of mobile devices, the region is generating massive amounts of big data. Moreover, the large population base and rapid urbanization provide a foundation for data collection and utilization.

Challenges

- **Asymmetry Between Input and Output:** While big data technologies offer high returns, the initial investment is also relatively high, particularly in building data infrastructure, data collection and storage, and research and development. This requires companies to have strong financial capacity and be prepared for long-term returns.

3 Technology

Advantages

- **Increased Corporate Technology Investment:** Benefiting from the digital transformation in the emerging Asia-Pacific market, the spread of cloud computing, and the development of AI, companies are increasing their spending on technology investments, particularly in fields such as big data analytics, machine learning, and artificial intelligence.
- **Digital Transformation of Enterprises:** Driven by global competitive pressures and technological innovation, companies in the emerging Asia-Pacific region are undergoing digital transformation to improve operational efficiency and market competitiveness. Big data technologies are widely applied in industries such as manufacturing, financial services, retail, and healthcare, helping companies make data-driven decisions in production, sales, and customer service.

Challenges

- **Challenges of Deepening Cloud Utilization :** As digital transformation accelerates in the emerging Asia-Pacific region, enterprises are moving from initial cloud adoption to more in-depth utilization of cloud computing resources. In this process, big data has become a key driver for business insights and innovation, placing new demands on cloud platforms. Companies expect to leverage cloud computing for business agility and innovation but also face challenges related to data processing capabilities, security, and cost efficiency.

Sources: ASEANBRIEFING, opengovAsia, ERIA, Frost & Sullivan

The big data industry in the emerging Asia-Pacific region has significant development potential, supported by favorable policies and promising prospects.

Malaysia

- Malaysia's big data industry is developing rapidly, driven by government policies, the construction of digital infrastructure, and increasing market demand.
- According to the Malaysia Digital Economy Blueprint, the Malaysian government is advancing digital economic development through the MyDigital initiative, with a goal to have the digital economy contribute 22.6% (later revised to 25.5%) of GDP by 2025. This plan covers the application of big data across various fields, including cloud computing, government digital transformation, and smart city development, promoting the widespread use of big data technologies among businesses and government institutions.
- The Malaysian Supreme Court utilizes a comprehensive data backup solution for e-governance and routine document management.

Bangladesh

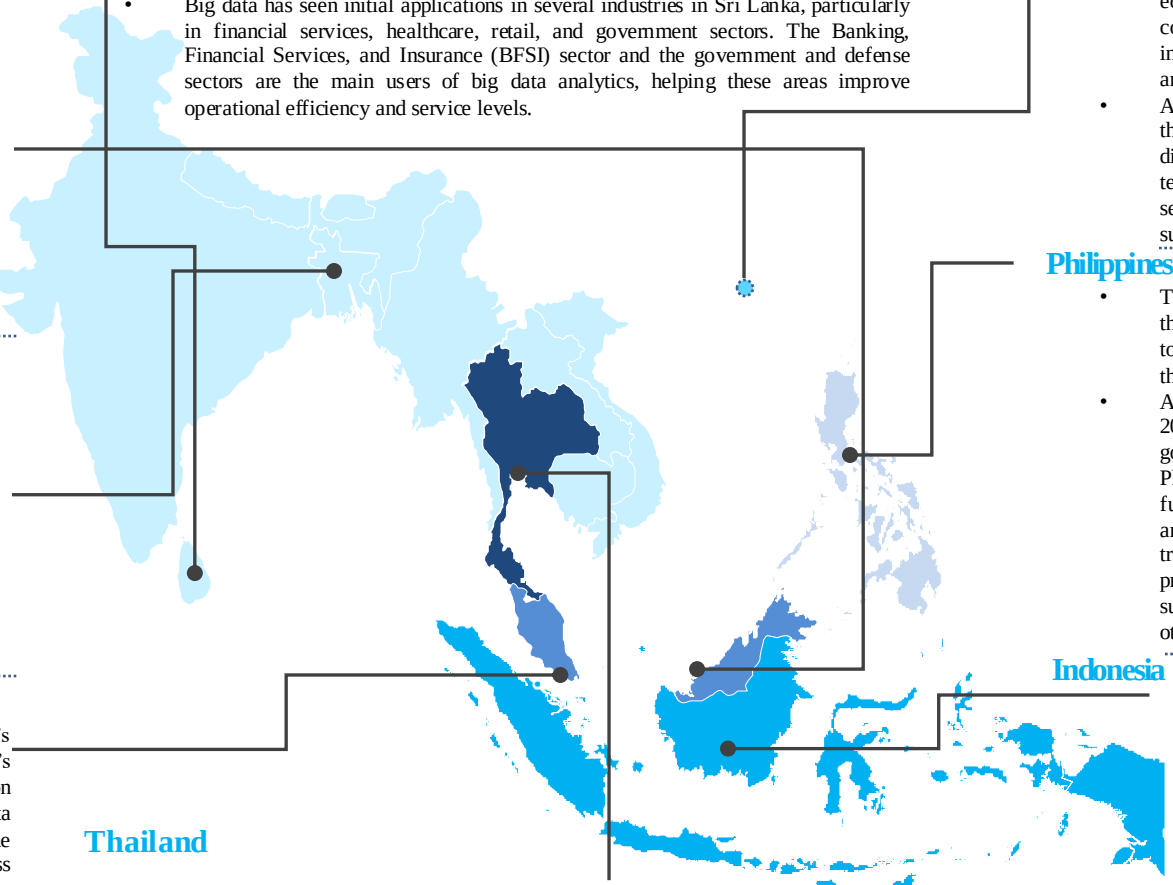
- The big data industry in Bangladesh is in a phase of rapid development, strongly supported by government policies. The Bangladeshi government launched the "Digital Bangladesh" initiative in 2009, aiming to drive the country's digital transformation through Information and Communication Technology (ICT) and position Bangladesh as a key player in the global digital economy. By 2041, the government's goal is to transform the country into a "knowledge economy." This strategy emphasizes the development of technologies such as big data, artificial intelligence, the Internet of Things (IoT), and blockchain.

Singapore

- Singapore boasts excellent infrastructure, including the world's busiest container port, top-rated airport services, and Asia's most extensive broadband internet system and communication network. However, it also faces the pressure of exponential data growth, which creates broader application scenarios for the integration of cloud computing and big data. This helps address the increasing demand for data processing and fosters the healthy development of cloud services and the digital economy.
- According to the Singapore Digital Economy Report 2023, the digital economy contributed 17.3% of Singapore's GDP in 2022, amounting to approximately SGD 106 billion, demonstrating the importance of big data in driving economic growth. By promoting the development of the Information and Communications (I&C) sector, Singapore has strengthened its digital services capabilities, such as cloud computing, data analytics, and software development.

Sri Lanka

- Sri Lanka's big data industry is still in its early stages, but with the country's digital transformation initiatives and investments in information technology infrastructure, the industry shows great potential.
- Big data has seen initial applications in several industries in Sri Lanka, particularly in financial services, healthcare, retail, and government sectors. The Banking, Financial Services, and Insurance (BFSI) sector and the government and defense sectors are the main users of big data analytics, helping these areas improve operational efficiency and service levels.



Thailand

- In 2022, the Thai government approved the establishment of the National Big Data Institute (BDI), replacing the former Government Big Data Institute (GBDi). The BDI aims to promote economic and social development through big data and provide data analytics services for both government and private institutions. The institute is also responsible for fostering innovation, particularly in the analysis of data related to health, environment, tourism, labor, and justice sectors.
- Big data is a key component of Thailand's "Thailand 4.0" strategy, which aims to drive the digital transformation of industry and the economy. Over the next five years, the Big Data Institute will focus on analyzing data in areas such as health, environment, and tourism to support government policy-making and social development.

Hong Kong SAR

- As a key international center for finance, trade, shipping, and communications in China, Hong Kong can leverage its unique advantages under the "One Country, Two Systems" framework and its status as a "domestic yet international" region to enhance its digital capabilities through data-driven approaches. This will boost Hong Kong's development in innovation and technology, the digital economy, and smart cities, contributing to the creation of a more livable, competitive, and sustainable city. These efforts also position Hong Kong as an international data hub, promoting the growth of industries that merge domestic and foreign data in Hong Kong.
- According to the 2023 Policy Address by the Chief Executive of Hong Kong, the city is committed to promoting data governance and the development of a digital government. The government plans to further develop the innovation and technology ecosystem by strengthening the management of data flows and data security. Additionally, Hong Kong will establish a supercomputing center to support the development of artificial intelligence and big data applications.

Philippines

- The Philippines possesses vast amounts of data and business activities, and both the government and enterprises have begun utilizing cloud and AI technologies to analyze data, improving operational efficiency, reducing costs, and enhancing the quality of operations and user experience.
- According to the Philippine Statistical Development Program (PSDP) 2018-2023, the PSDP aims to promote the application of big data to support government policy-making and planning by strengthening the capacity of the Philippine Statistical System (PSS). Big data is seen as a crucial foundation for future productivity and innovation. The PSDP promotes the integration and analysis of big data, administrative data, and citizen-generated data through the training of statisticians in the use of open-source software. Additionally, the program places special emphasis on the Sustainable Development Goals (SDGs), supporting their implementation and monitoring through the use of big data and other statistical resources.

Indonesia

- Indonesia, with its large population and fast economic growth, still has untapped potential in internet penetration, providing ample opportunities for the integration of big data and cloud computing. Additionally, the Indonesian government has made the technology industry a key part of its development strategy, aiming to leverage digital economic growth to become one of the world's top ten economies. With policy support and inherent advantages, foreign cloud service providers and tech companies have successfully localized their operations in Indonesia.
- According to IDC, the big data and analytics software market in Indonesia grew by 14.7% in the first half of 2022, indicating increased enterprise investment in big data technologies, particularly driven by the need for cost optimization, efficiency improvements, and access to new markets. The government is also encouraging digital transformation across more industries through these initiatives.

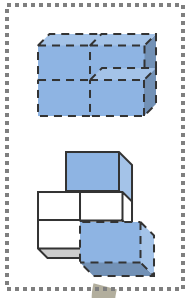
Sources: Malaysia Digital Economy Blueprint, Singapore Digital Economy Report, The Thaiger, Hong Kong 2023 Policy Address by the Chief Executive, Frost & Sullivan, World Economic Forum, Asian Development Bank

The big data solutions market refers to the process of effectively collecting, storing, computing, analyzing, and applying massive amounts of data using computer hardware and software technologies. This process helps enterprises extract valuable information from vast amounts of raw data in real time, supporting business decision-making.

- **Big Data Service Classification Standards:** The classification standards for big data platform services include the diversity of data collection types (handling structured, semi-structured, and unstructured data), storage methods (differentiating between data lakes and data warehouses), computational capabilities (supporting batch processing and real-time stream processing), and intelligent analytics capabilities (integrating AI and machine learning for data prediction and optimization). These standards ensure that platforms can meet complex and diverse business needs, covering the entire process from data collection and storage to intelligent analysis, helping businesses achieve efficient decision-making support and business optimization.
- **Key Components of Big Data Services:** The core components of a big data platform include multi-source data collection and integration, data lake and data warehouse storage and processing, AI-driven data analysis and prediction, and business optimization based on analysis results. These components enable businesses to flexibly manage and utilize data, optimize business processes, enhance market competitiveness, and implement intelligent data management solutions.

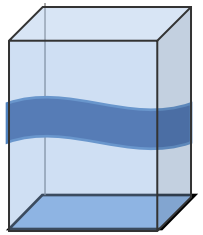
Data is collected from various sources

Structured Data
Credit card numbers
Dates
Financial amounts
Phone numbers
…



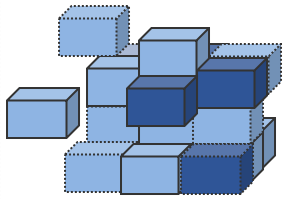
Unstructured Data
Web pages
Emails
Social media platform content
Audio, video
…

Data enters the data lake for processing and access

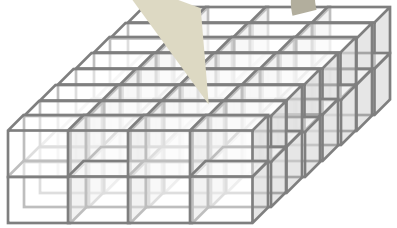


Data Lake (DLI, MRS, DataArts Studio, Amazon S3, Azure Data Lake Storage)
A location for storing large volumes of structured or unstructured data from multiple sources
Enterprises process and analyze data on demand

Processed data is used for advanced business analysis

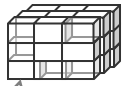


AI + Data Lake (DataArts Studio, Delta Lake, Google BigQuery, Apache Iceberg)
By combining AI and data lake technologies, enterprises can leverage AI models to analyze massive amounts of data stored in data lakes, automate the processing of unstructured data, and extract valuable business insights.



Data Warehouse (DWS, Oracle Exadata, IBM Netezza, Cloudera)
A high-performance system used for storing and managing structured enterprise data, focusing on supporting large-scale data analysis and queries, often used for handling high-traffic, mission-critical business data.

Analysis Results Used for Business Optimization



Optimization Models and Risk Assessment (ModelArts, Google Cloud AI Platform, Azure Machine Learning)
AI and machine learning enable smarter data lakes by modeling and predicting large-scale data in data analysis. This enhances the predictive and analytical capabilities of data, helping businesses identify potential patterns and optimize operational processes.

Real-Time Data Warehouse and Business Intelligence (Teradata Vantage, DWS, DLA, Azure Synapse Analytics)
With real-time data provided by real-time data warehouses and BI platforms, businesses can transform data analysis results into visual charts, aiding management in better understanding the data and providing real-time insights.

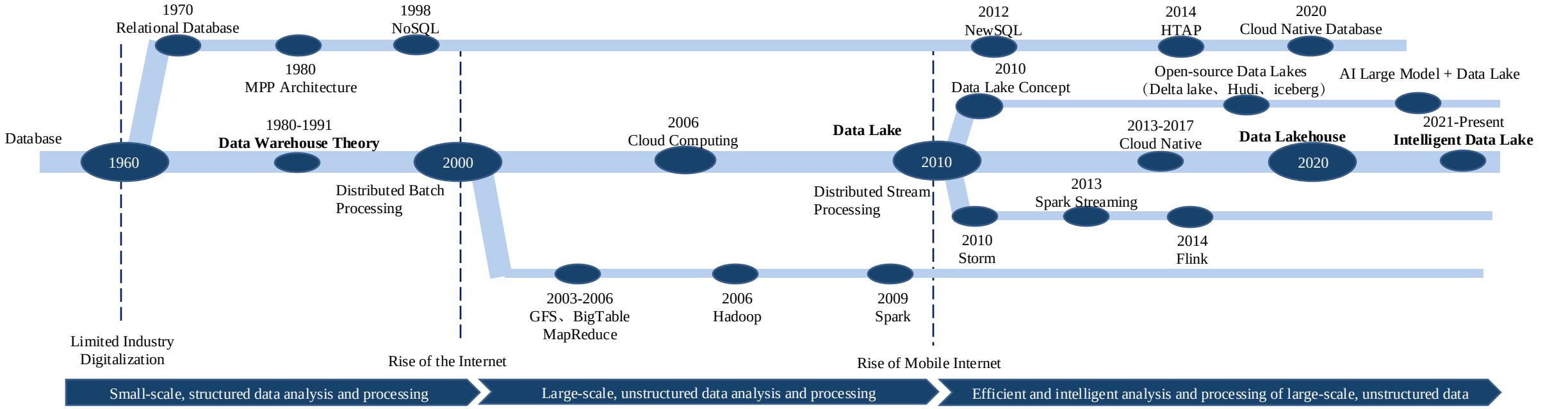
Real-Time Business Response (CSS, TBDS)
By utilizing real-time search and locating specific data, the efficiency of structured data retrieval is improved, enabling businesses to make quick decisions and achieve agile business operations.

Sources: Frost & Sullivan

Big data platform technology has continuously evolved from database technology, experiencing phases of separation and integration. Facing changing business demands in the Asia-Pacific region, technological evolution is moving towards integration, essentially combining the advantages of various technologies to meet the high-performance and real-time requirements of complex scenarios.

- **The Rise of Data Warehouses:** Data Warehouses first appeared in the mid-1980s, designed to support corporate decision-making by integrating structured data. As data volumes surged, traditional data warehouses struggled with scalability and could not efficiently handle peak demand. In the Asia-Pacific region, especially in Singapore and Hong Kong, the application of data warehouse technology has matured, and enterprises have begun adopting cloud data warehouse solutions to enhance data processing capabilities and reduce costs.
- **The Emergence of Data Lakes:** Data Lakes have risen as a new data storage solution, capable of handling both structured and unstructured data, offering greater flexibility. They allow enterprises to store data without predefining its structure, though governance challenges have impacted the efficiency of data querying and management. In Indonesia, e-commerce and fintech companies leverage data lakes to optimize operations, improve customer experiences, and enhance business decision-making. Similarly, Malaysian companies are actively exploring the application of data lakes to adapt to rapidly changing market demands.
- **Integration of Data Lakes and Warehouses:** In recent years, the Data Lakehouse architecture has emerged, combining the flexibility of data lakes with the structured management advantages of data warehouses. This architecture eliminates data silos between lakes and warehouses, enabling seamless data management with low-cost storage, without data migration, and with efficient data flow. Huawei Cloud has enhanced the Lakehouse architecture with integrated batch-stream processing, enabling real-time data analytics where data is updated in the lake in seconds, allowing real-time data retrieval and significantly improving user experiences from T+1 to T+0. In Thailand, manufacturing enterprises are gradually adopting the Lakehouse architecture, using real-time data analytics to drive smart manufacturing and digital transformation, improving production efficiency.
- **The Rise of Intelligent Data Lakes:** Intelligent Data Lakes combine artificial intelligence and big data technologies to automate data management and analysis, enhancing data utilization and insights. Huawei's Intelligent Data Lake operational platform is a prime example, providing intelligent data governance and analytics to help enterprises quickly build data operations capabilities and maximize the value of their data assets. In the Asia-Pacific region, Singaporean enterprises are at the forefront of Intelligent Data Lake adoption, using AI technologies for data processing and analysis to support intelligent decision-making and business innovation.

Classification of Big Data Platform Technology Evolution



Source: China Academy of Information and Communications Technology, Frost & Sullivan

Addressing the challenges of data integration, network security, and user experience for telecom operators: Big data technology drives precise optimization, enhances personalized services, and improves resource management.

Pain Points in the Telecommunications and Telecom Operators Industry

- **Challenges in Data Management and Integration:** As of 2023, the total number of internet users in the emerging Asia-Pacific region, particularly in Southeast Asia, reached 442 million, with an internet penetration rate of 78%, significantly higher than the global average of 67.5%. Indonesia has the largest user base, with 205 million users, while Singapore has the highest internet penetration rate at 92%, followed closely by Malaysia at 89.6%. Telecom operators in the emerging Asia-Pacific region face massive volumes of data, with increasing complexity in aggregating data from multiple sources (e.g., network traffic, user behavior, device data). The issue of data silos exacerbates this challenge, making it difficult for different departments and systems to share data, affecting the efficiency of data integration and hindering the ability to perform cross-business data analysis and optimize network performance quickly.
- **Demand for Network Optimization and Enhanced User Experience:** With increasing market competition, telecom operators not only need to improve network quality and user experience but also must monitor and optimize network performance in real-time, especially during fluctuations in user traffic. For example, SingNet, a subsidiary of Singapore Telecommunications, experienced a 24-hour internet outage due to server overload. Current data analysis tools cannot respond and analyze data in real-time, leading to delays in network adjustments and an inability to accurately understand user needs and behavior changes, thus impacting customer satisfaction and market share.
- **Network Security Issues:** As the volume of data grows, telecom operators face heightened security risks, including threats of cyberattacks and data breaches. In 2020, a Thai telecom operator leaked 8.3 billion network records, causing significant losses. With the rise in cybercrime and increasingly stringent data protection regulations, telecom operators must continually upgrade their data protection measures while maintaining strict management of data privacy.

Practical Application Scenarios and Use Cases of Big Data Solutions

1. **Network Optimization and Enhanced User Experience:**
By leveraging big data analytics, telecom operators can monitor network traffic in real-time, predict user demands, and optimize the allocation and utilization of network resources. With the integration of Artificial Intelligence (AI) technology, operators can automate network traffic load adjustments, improving user experience, especially during peak times, ensuring network stability and service quality.
2. **Precision Marketing and Customer Management:**
Through precise behavioral analysis of users using big data, operators can customize personalized services and packages. This is particularly important in the culturally diverse emerging Asia-Pacific region, where such efforts can enhance customer loyalty and engagement. Additionally, data analysis can help operators gain insights into customer preferences and market competitiveness, enabling them to promptly launch differentiated products and services to strengthen their competitive edge.
3. **Network Security and Risk Mitigation:**
The combination of big data and AI can help operators predict network threats in advance, reducing the risk of network outages. Moreover, with real-time analysis and alert systems, operators can quickly identify potential security threats, enhance network security, protect customer data privacy, and reduce the occurrence of data breaches.
4. **Revenue Forecasting and Business Planning:**
Using trend models and analytics tools powered by big data, operators can accurately forecast future revenue streams and changes in user behavior, optimizing business strategies. Predictive analytics enables operators to plan resource allocation in advance, strategically manage investments and business expansion, and improve the accuracy of financial and business planning.

TELKOMSEL

- **Indonesia's largest mobile operator, Telkomsel, partnered with Huawei Cloud** to optimize network performance and customer experience using big data analytics services. By analyzing user data in real-time, Telkomsel achieved precise network optimization, improved resource utilization, and delivered personalized data packages and content services. The big data services significantly enhanced customer satisfaction and created new revenue growth opportunities for the company.

Smart

- **Cloudera partnered with Cambodia's telecom operator, Smart Axiata,** to help integrate its data lake with traditional data warehouses, addressing the issue of data silos. With Cloudera's solution, Smart Axiata achieved real-time data processing, improved customer experience, and optimized network performance. This partnership enabled Smart Axiata to gain clearer insights from their data, improving the frequency and efficiency of report generation.

Source: Temasek, Huawei, Frost & Sullivan

Addressing the challenges of risk management, data privacy protection, and complex data in the financial industry: Big data technology drives precise compliance, enhances personalized services, and optimizes financial forecasting.

Pain Points in the Financial Industry

- **Risk Management and Data Compliance Pressure:** Financial institutions need to monitor and analyze large volumes of transaction data in real-time to prevent potential financial risks. However, existing systems struggle to support efficient real-time data analysis, making it difficult to respond quickly to market changes. Additionally, strict regulatory requirements have increased the pressure on data compliance management, particularly in protecting customer privacy and preventing fraud.
- **Data Complexity and Low Analysis Efficiency:** In the emerging Asia-Pacific region, digital payments now account for more than 50% of transactions in the region. Moreover, the digitization rates in financial sectors such as lending, insurance, and wealth management are continuously increasing, making data more complex. At the same time, the financial industry has diverse data sources, including user transaction records and consumption behavior, resulting in complex data structures and challenging analysis processes. This complexity affects financial institutions' ability to develop precise risk strategies and marketing plans.
- **Data Security and Privacy Protection:** With the rise of digital banks in the emerging Asia-Pacific region and governments' promotion of digital innovation in the lending sector, such as Vietnam's fintech sandbox, a large amount of sensitive information is being moved to the cloud. Financial institutions face security risks and incidents such as data breaches, misuse, theft, and tampering. They need to strengthen data security management by implementing technical and institutional measures, establishing a robust data security system, and effectively protecting financial data security. Additionally, there is a need to focus on personal information protection, particularly in areas like identity verification and payments, regulating the use of facial recognition data to enhance customer trust.

Practical Application Scenarios and Use Cases of Big Data Solutions

1. **Data Storage and Management:**
Financial institutions use big data platforms to analyze transaction data in real-time, quickly identifying potential fraud and financial risks. By leveraging machine learning models, they build more accurate risk management systems, enhancing financial security.

2. **Personalized Services and Customer Segmentation:**
Big data enables financial institutions to analyze customer behavior, spending habits, and preferences, providing personalized financial products and services. This improves customer experience and loyalty, driving cross-selling and the promotion of value-added services.

3. **Compliance Management and Data Security:**
Big data analytics helps financial institutions ensure that their operations comply with increasingly stringent regulatory requirements, particularly in terms of data privacy and compliance management. Through data platforms, institutions can effectively mitigate potential legal risks.

4. **Financial Analysis and Revenue Forecasting:**
By integrating historical transaction data and market dynamics, financial institutions can perform more accurate financial analysis and revenue forecasting, optimizing liquidity and capital allocation.

AHAM CAPITAL ASSET MANAGEMENT

- **During its transformation, AHAM Capital, one of Malaysia's leading asset management companies, boldly embraced digitalization by moving its operations to the Microsoft Azure cloud.** This strategic shift accelerated client onboarding, transaction speeds, and enhanced the customer experience. The company has digitized 75% of client transactions, significantly improving data accuracy. With a strong foundation in scalability and flexibility, AHAM Capital is poised to establish new partnerships with digital players and expand into new markets.

GLDB

- Singapore's Green Link Digital Bank (GLDB) has also excelled in its application of big data. Through its partnership with Huawei Cloud, GLDB quickly obtained security compliance certification from the Monetary Authority of Singapore (MAS). Additionally, **Huawei Cloud's cloud-native and big data services provided GLDB with a comprehensive digital banking solution, enabling customers to enjoy a consistent service experience across regions and in multiple languages.**

Source: Temasek, Microsoft, Deloitte, Frost & Sullivan

Addressing challenges of data silos, cross-departmental collaboration, and security governance in government: Big data drives digital transformation and optimization of public services.

Pain Points in the Government Sector

- **Data Silos and Inefficient Departmental Collaboration:** In the emerging Asia-Pacific region, the independent management of data by government departments has led to data silos. The lack of effective data-sharing mechanisms between departments results in difficulties in cross-departmental collaboration, reducing the efficiency of policy formulation and implementation, especially in digital projects involving multiple departments, where progress is often slow.
- **Insufficient Technical Capabilities and Data Governance Challenges:** Government institutions generally lack professional data analysts and robust technical infrastructure, resulting in poor data governance, which limits the application of big data in smart cities and public services. This hinders the progress and effectiveness of digital transformation. Most countries in the region rely on foreign investment for their smart city and digital infrastructure development. Currently, over 200 Japanese companies are involved in smart city projects across 26 cities in the emerging Asia-Pacific region, including Hanoi and Da Nang in Vietnam, Mandalay in Myanmar, Kota Kinabalu in Malaysia, Jakarta in Indonesia, and New Clark City in the Philippines.
- **Big Data Privacy and Security Pressure:** Government agencies face significant pressure in protecting the privacy and security of the large volumes of sensitive data they handle, such as citizens' personal information and health data. This challenge is particularly pronounced when dealing with cross-border data transfers and compliance requirements, where inadequate security measures increase the risks of data breaches and regulatory violations.

Practical Application Scenarios and Use Cases of Big Data Solutions

1. **Smart Cities and Public Service Optimization:**
Governments can leverage big data technologies to integrate data from multiple sectors such as transportation, energy, and public safety to improve the efficiency of public services. In smart city initiatives, data analytics helps optimize resource allocation and enhances the intelligence of city management. In 2018, ASEAN launched the ASEAN Smart Cities Network (ASCN), selecting 26 pilot cities.

2. **Policy Formulation and Decision Support:**
Government departments use big data platforms to integrate various socio-economic data, providing support for policy-making and social governance. Data forecasting and analysis can also help governments respond to emergencies and natural disasters.

3. **Data Sharing and Cross-Departmental Collaboration:**
Big data technology can break down the "data silos" between departments, facilitating data sharing within and across government departments, enhancing collaboration efficiency, and improving public management outcomes.

4. **Public Safety and Risk Early Warning:**
Through real-time data monitoring, governments can quickly detect potential social risks (such as natural disasters or pandemics) and take timely emergency measures, improving public safety management.

- **The Thai government has partnered with Amazon Web Services (AWS) to accelerate its digital transformation.** AWS plans to establish an Asia-Pacific (Bangkok) region in Thailand, investing over $5 billion to build three data centers. Various sectors in Thailand will be able to utilize AWS's cloud computing and big data technologies to securely store and process data. Government agencies will improve public service efficiency, foster innovation in fields such as artificial intelligence, and achieve digital economy goals.

- The Integrated Health Information Systems (IHiS) is Singapore's national health technology agency for the public healthcare sector, with the mission to digitize, connect, and analyze the nation's health ecosystem. **IHiS advanced its work in HD VSM by developing and deploying Health Discovery Plus (HD+) on Azure.** This upgrade allows the healthcare sector to more promptly and efficiently detect patients' health conditions.

Source: Microsoft, Frost & Sullivan

Addressing privacy compliance, technical bottlenecks, and talent shortages: Big data empowers internet companies to enhance business growth and market competitiveness.

Pain Points in the Internet Sector

- **Data Compliance and Privacy Protection:** As the emerging Asia-Pacific region strengthens data privacy regulations (such as the Philippines' Data Privacy Act and Thailand's Personal Data Protection Act), internet companies face stringent data compliance requirements. This mandates that businesses ensure legality throughout data collection, storage, and usage, increasing operational costs and complexity.
- **Insufficient Technology and Infrastructure:** Fixed broadband access speeds in ASEAN countries are uneven. In 2023, only Singapore and Thailand achieved speeds of 200 Mbps, while most other countries had speeds around 100 Mbps. In terms of broadband access, Thailand (58%), Malaysia (50%), and the Philippines (33%) lag far behind Singapore's 111%. Incomplete infrastructure in many regions presents challenges for businesses in collecting and analyzing big data, limiting data-driven decision-making, especially in remote areas where internet connectivity and data processing capabilities are insufficient, thus impacting market competitiveness.
- **Big Data Talent Shortage and Skills Gap:** The emerging Asia-Pacific region faces a shortage of talent in data science and big data analytics, limiting businesses' ability to make data-driven decisions and innovate. The lack of specialized talent creates difficulties for companies when implementing big data strategies, preventing them from fully leveraging big data's potential, ultimately affecting business growth and optimization.

Practical Application Scenarios and Use Cases of Big Data Solutions

1. **User Data Analysis and Personalized Recommendations:**
Internet companies use big data platforms to analyze user behavior data in real-time, such as browsing habits and click records, to provide accurate personalized content and ad recommendations. This personalized service effectively increases user engagement and conversion rates, enhances user retention, and boosts platform activity and commercial value.

2. **Market Insights and Competitiveness Enhancement:**
Through big data analytics, internet companies can quickly identify market trends, understand changes in consumer demand, and swiftly adjust market strategies. Additionally, big data provides insights into competitors, helping companies develop flexible responses and maintain a competitive edge, thereby increasing overall market competitiveness.

3. **Data Quality and Analysis Accuracy:**
Leveraging big data technology, companies can integrate data from various channels to improve data accuracy and consistency. By effectively consolidating and cleaning multi-source data, companies can more accurately analyze user behavior, optimize user experiences, improve business models, and enhance the precision of decision-making.

4. **Privacy Protection and Compliance Management:**
Big data platforms help companies manage and protect user data effectively. Through data encryption, auditing, and monitoring , they ensure that data processing complies with privacy regulations, preventing data breaches. Big data technology also simplifies compliance processes, enhancing corporate compliance and data security in the emerging Asia-Pacific region, thereby increasing user trust.

- **Bukalapak, through BukaTabungan, leverages AWS's big data services to provide efficient financial services to 110 million users and 21 million businesses.** By using Amazon S3 to store and centrally manage users' transaction and account information, combined with Amazon RDS for real-time processing of large-scale data, BukaTabungan can quickly analyze users' financial records, enabling online account opening within five minutes and personalized services. These big data solutions have promoted financial inclusion and improved service efficiency.
- Gojek, a well-known super app platform in Indonesia, offers services such as ride-hailing, food delivery, and payments. **By integrating with Google Cloud, Gojek analyzes user behavior data, traffic conditions, and market demand in real-time to optimize its services and operational efficiency.** The platform uses big data technology to predict high-demand areas, dynamically adjust driver allocation, and enhance service response speed.

Source: China Council for the Promotion of International Trade Academy, World Bank, AWS, Frost & Sullivan

Addressing data security and supply chain challenges for large enterprises: Big data drives real-time analysis, risk management, and enhanced market responsiveness.

Pain Points for Large Enterprises

- **Challenges in Multi-Source Data Integration and Complex Project Management:** Large enterprises often face the issue of data fragmentation across different departments and systems. This not only makes it difficult to establish a unified data management platform but also complicates the management and coordination of complex projects. In cross-departmental decision-making and project implementation, data silos prevent efficient data sharing and analysis, impacting project progress monitoring, resource allocation optimization, and risk identification. To address this, enterprises need to implement comprehensive big data integration solutions that enable centralized data management, real-time monitoring, and improved communication and coordination, enhancing decision accuracy and project management efficiency.
- **Unmet Demand for Real-Time Data Analysis:** In fast-changing market environments, particularly in industries like engineering and transportation, enterprises need to respond quickly to market shifts. However, existing data analysis systems often fail to meet the demand for real-time analysis, leading to delays in decision-making. These delays can negatively impact production efficiency and supply chain management.
- **Data Security Threats to Large Enterprises:** Cybersecurity has become a major pain point in data governance for large enterprises. According to the Cyber Security Agency of Singapore, 8 out of 10 companies have experienced cybersecurity incidents in recent years. Frequent cyberattacks result in data breaches and system interruptions, affecting company reputation and customer trust while increasing legal liabilities.

Practical Application Scenarios and Use Cases of Big Data Solutions

1. **Supply Chain Optimization and Equipment Monitoring:**
Big data platforms provide real-time monitoring of supply chain dynamics, helping businesses optimize inventory management, reduce resource waste, and improve logistics efficiency. Manufacturing companies can use big data to monitor equipment status in real-time, predict and prevent equipment failures, and schedule maintenance in advance, thereby reducing downtime and improving production efficiency.
2. **Production Process Optimization and Elastic Scalability:**
Big data analytics helps businesses optimize production processes, increase automation, and reduce labor costs. By forecasting market demand, companies can flexibly adjust production plans to avoid overproduction or excess inventory. Additionally, by utilizing the elastic scalability of public cloud services, businesses can rapidly adjust computing resources based on market demand to cope with production changes.
3. **Market Demand Forecasting and Precision Marketing:**
By analyzing market trends, consumer behavior, and supply chain data, big data platforms help businesses better understand market demand, enabling them to create targeted marketing strategies and product promotion plans, thereby enhancing market competitiveness. Companies can leverage big data technology for real-time business analytics, optimizing market response speed.
4. **Data Security and Intelligent Management:**
In a hybrid cloud environment, businesses use private clouds to encrypt and isolate sensitive data, ensuring data security and compliance with regulations. By leveraging AI and edge computing technologies, companies can achieve intelligent equipment monitoring, risk management, and business analytics, ensuring the security and efficiency of data processing.

SIAM PIWAT

- Siam Piwat faced the challenge of bridging the gap between its physical stores and online presence. It needed a robust technology solution to empower its tenants to enhance online engagement, launch promotions, and ensure a seamless customer shopping experience. **Siam Piwat turned to Huawei Cloud to power its omnichannel "ONESIAM" app, utilizing Huawei Cloud's extensive services and tools to successfully integrate physical stores, e-commerce websites, and mobile applications,** thereby providing customers with a consistent shopping experience.

PETRONAS

- Petronas, the national oil company of Malaysia, is involved in the exploration, production, and sale of oil and gas. **Petronas partnered with IBM Cloud, leveraging its cloud computing and data analytics solutions to integrate and manage data, supporting its digital transformation.** IBM provided a secure digital solution to accurately address data-driven business questions related to daily production, current trends, and drilling progress.

Source: IBM, Huawei, Frost & Sullivan

Cost efficiency, security, scalability, and system stability are key considerations for companies in the Asia-Pacific region when selecting big data platforms.

Key Procurement Factors

Enterprises in the emerging Asia-Pacific region are actively embracing big data service transformation.

> Companies aim to reduce operational costs, enhance data security, ensure flexible scalability, and maintain high system performance and stability through big data platforms, supporting their long-term business growth and competitive advantage.

> ***Pak Hendri Mulya Syam, CEO of Indonesia's leading company Telkomsel, stated:*** *"Through digital collaboration with Huawei, Telkomsel will continue to innovate and apply the most advanced technologies in the industry to ensure the sustainable development of Indonesia's national digital transformation roadmap."*

Cost and Cost-Effectiveness

- For enterprises in the emerging Asia-Pacific region, cost and cost-effectiveness are among the core factors when selecting a big data platform. Companies must consider not only the initial investment costs but also focus on long-term operational and maintenance expenses. The application of storage-compute separation technology optimizes resource allocation, helping companies maintain high-performance data processing while reducing unnecessary resource waste, thereby achieving cost optimization. **High-value solutions provided by professional teams from established big data service providers not only reduce hardware and operational investments but also ensure sustained profitability in the face of market competition.**

Data Security and Privacy Protection

- In the emerging Asia-Pacific region, data security and privacy protection are highly prioritized by local regulations, especially in industries such as finance and government, where data security is a core concern when selecting a big data platform. **Customers expect big data platforms to provide full lifecycle security protection, from data collection and transmission to storage and processing.** Enterprises need to prevent data breaches while ensuring compliance with local laws and regulations, such as Singapore's Personal Data Protection Act (PDPA) or China's Cybersecurity Law. Big data platforms must offer multi-layered security mechanisms, including data encryption and access control, to ensure the safety of sensitive data.

Service Support and Compatibility

- When selecting a big data platform, enterprises need to consider not only the platform's compatibility and adaptability to meet complex business requirements and evolving market conditions but also the service and support offered by the provider. **Comprehensive consultation, design, delivery services, and localized support** ensure that the platform seamlessly integrates with existing IT infrastructure, supports cross-platform and multi-cloud environments, and avoids vendor lock-in, ensuring business flexibility and agility.
- A highly compatible big data platform should flexibly scale with the growth or changes in the enterprise's business operations and support diverse data sources and analytics tools. At the same time, **a professional service team can offer tailored solutions**, providing full support from requirement analysis, architecture design, to implementation, deployment, and ongoing maintenance. Localized service support is especially crucial in promptly addressing business needs, solving practical issues, and helping enterprises quickly adapt to market changes, thereby accelerating their digital transformation process.

Stability and High Performance

- In high-load and large-scale data processing environments, enterprises place great importance on the stability and performance of big data platforms. High availability is key to ensuring business continuity, especially in industries like telecommunications and finance that require real-time data processing. **Low latency and high concurrency handling capabilities are crucial.** Through distributed storage and redundancy design, enterprises can quickly recover from unexpected platform incidents, ensuring uninterrupted business operations. Additionally, the platform's high-performance data processing capabilities support real-time monitoring, analysis, and decision-making, thereby improving operational efficiency.

Source: Huawei, Tassure, Frost & Sullivan

The accelerating urbanization and digital transformation trends in the emerging Asia-Pacific region are driving diverse demands for big data services.

More Flexible Data Storage Demand

- **Urbanization and e-commerce growth in the emerging Asia-Pacific region are driving increased demand for data storage:** As urbanization accelerates in countries such as Indonesia, Thailand, and the Philippines, with rapid growth in urban populations, the generation of urban data in areas like traffic management, energy usage, and public services is expected to rise significantly. Additionally, e-commerce and digital payments in the emerging Asia-Pacific region are expected to continue expanding rapidly, exceeding the global average growth rate by 10%. This will prompt financial institutions and retailers to upgrade their data storage and analytics platforms to meet the emerging data demands.
- **More Flexible Data Storage Solutions:** In this context, companies need flexible storage solutions to address growing data needs. The ability to flexibly allocate and independently scale computing and storage resources becomes crucial. By utilizing AI large models, companies can analyze and process massive amounts of data more quickly and efficiently. Furthermore, businesses are increasingly adopting hot and cold data storage strategies, storing frequently accessed data in high-speed storage while moving less frequently used data to low-cost storage, ensuring both performance and cost-effective storage management.

Industry-Specific Customized Data Platform Demand

- **Growth in Personalized Services and Data Demand:** The rapid development of fintech and healthcare industries in the emerging Asia-Pacific region, especially in Singapore, Malaysia, and Thailand, is driving demand for personalized services and customized data platforms. Financial institutions need intelligent data platforms to support real-time user behavior analysis, enabling personalized financial solutions. Meanwhile, the digital transformation of the healthcare sector, along with the increase in unstructured data such as electronic medical records and medical imaging, is pushing healthcare institutions to seek more precise analytics and personalized treatment solutions.
- **Data Demand in the Telecommunications Industry**: As the telecommunications industry undergoes digital transformation, companies are using data to analyze user behavior, generate customer profiles, optimize customer experiences, and resolve issues. Intelligent data platforms will enhance telecom operators' decision-making capabilities through real-time data analysis, better meeting customer needs. The integration of AI large models with customized data platforms will help companies achieve automated data mining and analysis, increasing the intelligence of data governance.

Real-Time Data Processing Demand

- **Real-Time Data Needs in Retail and Supply Chain Management:** As the emerging Asia-Pacific region serves as a key global manufacturing and export base, companies are increasingly relying on real-time data analytics to optimize supply chain management. Post-pandemic flexibility demands have driven businesses to use real-time data analysis tools to improve logistics scheduling, inventory management, and supply chain planning, enabling them to respond to rapidly changing market conditions.
- **E-commerce and Customer Experience Optimization:** Emerging Asia-Pacific e-commerce platforms like Shopee and Lazada require real-time data processing technologies to track customer behavior, analyze sales trends, and quickly respond to market shifts. The widespread application of real-time data platforms will allow e-commerce businesses to more efficiently adapt to rapidly changing consumer demands. Furthermore, the application of AI large models enables companies to improve response times and decision-making accuracy in complex business scenarios, driving market demand for expanded real-time big data platforms.

Privacy Protection and Compliance Requirements

- **Advancement of Privacy Protection Regulations:** With the implementation of privacy protection laws such as the Philippines' Data Privacy Act and Thailand's Personal Data Protection Act (PDPA), companies in the emerging Asia-Pacific region face increasingly stringent compliance requirements. In industries such as finance and healthcare, businesses need customized privacy protection solutions to meet the legal requirements of each country regarding data processing.
- **Increased Demand for Localized Data Storage:** In the future, compliance requirements for localized data storage in emerging Asia-Pacific countries will drive multinational companies to establish data centers locally, ensuring that sensitive data adheres to local legal standards. This trend will fuel rapid growth in the local data center and cloud services market.

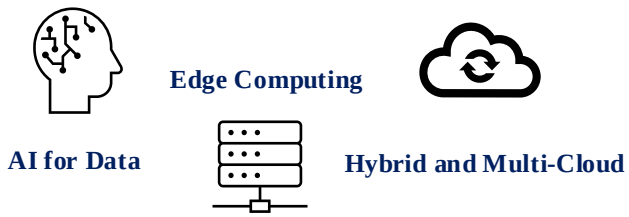
来源：TikTok、弗若斯特沙利文

The integration of AI for Data, edge computing, intelligent data lakes, and hybrid cloud technologies is expected to enhance the data processing capabilities of businesses in the emerging Asia-Pacific region, helping them address the challenges of large-scale, real-time data.

AI for Data

- **AI for Data Technology Development Trends:** AI for Data will replace traditional data governance with automated data processing tools, driving enterprises to achieve more efficient and precise data management. Powered by AI-driven automated data cleaning and classification tools, this technology significantly accelerates data analysis and reduces human intervention. At the same time, automated parameter-tuning technology will enhance the adaptability and efficiency of big data platforms. Through AI-driven dynamic optimization algorithms, businesses can automatically adjust platform parameters based on real-time business needs, ensuring efficient data processing capabilities.
- **Potential Impact on Specific Industries:** AI for Data will lead intelligent upgrades in the fintech and healthcare industries. Financial institutions will accelerate the development of personalized services, while healthcare organizations will optimize patient management processes when handling unstructured data such as electronic medical records. At the same time, the rapid expansion of e-commerce and logistics industries in the emerging Asia-Pacific region will drive companies to rely on automated parameter-tuning technologies to optimize warehousing, logistics, and order management, enabling them to quickly respond to traffic fluctuations during promotional periods and improve system stability.

Multi-Cloud and Hybrid Cloud-Driven Big Data Platforms



The Combination of Real-Time Computing and Data Lakes

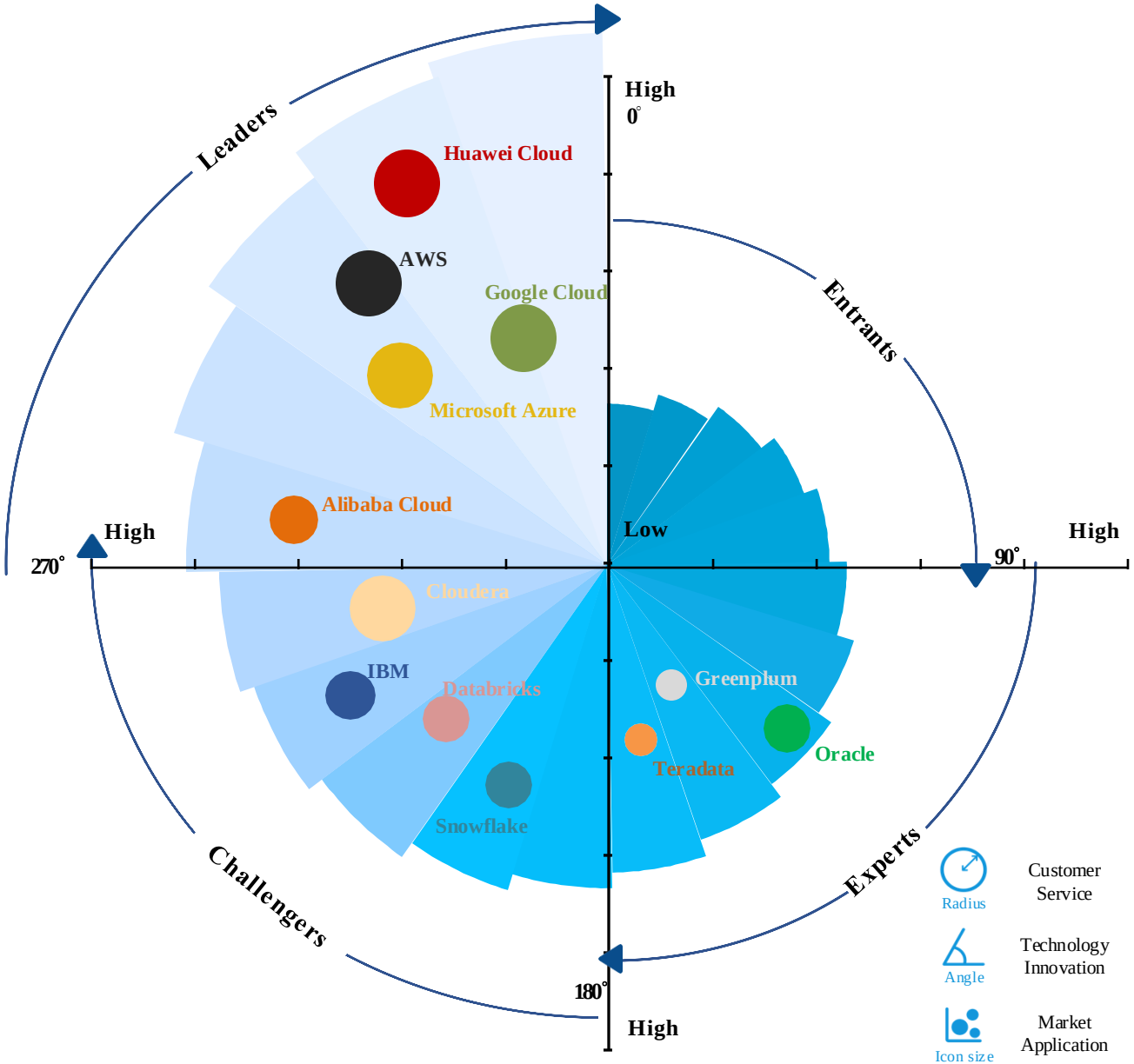
- **Development Trends in Real-Time Computing and Intelligent Data Lake Technologies:** The integration of intelligent data lakes with real-time computing will enable businesses to more flexibly manage large-scale, real-time data streams. These technologies enhance data processing capabilities through distributed computing architectures, meeting the real-time analytics needs of industries such as finance and retail.
- **Potential Impact on Specific Industries:** The financial industry will rely on intelligent data lake technologies to optimize risk management in high-frequency trading, while retail businesses will use real-time computing technologies for precise inventory management and customer behavior analysis. Real-time data processing platforms will play a critical role in the retail and financial markets of the emerging Asia-Pacific region, helping businesses optimize data-driven decision-making.

The Fusion of Edge Computing and Intelligent Data Lakes

- **Edge Computing and Intelligent Data Lakes:** With the rise of the Internet of Things (IoT), edge computing will be deeply integrated with intelligent data lakes, enabling distributed computing and flexible data management. This combination not only reduces data transmission latency but also dynamically scales storage and computing capabilities to meet the evolving demands of massive data.
- **Potential Impact on Specific Industries:** In the emerging Asia-Pacific region, manufacturing companies will optimize supply chain and production scheduling through the integration of edge computing and intelligent data lakes. Meanwhile, IoT devices in smart city projects will rely on edge computing technology for real-time data processing, enhancing the intelligence of urban functions such as traffic management and energy efficiency.

Sources: Frost & Sullivan

Emerging Asia-Pacific Competitive Leadership Map — Huawei Cloud ranks first in overall competitiveness in the emerging Asia-Pacific big data market.



Evaluation Criteria

- **The "Market Application" of Big Data Service Providers is Represented by Icon Size (Icon Size):**

Market performance assesses the business coverage and market share of service providers in the Asia-Pacific region, particularly their depth of application in industries such as finance, government, and telecommunications. Focus is placed on the adaptability and expansion speed of big data solutions in emerging markets (e.g., Indonesia, Thailand, the Philippines) and the evaluation of their market growth potential to meet diverse industry needs effectively.

Extensive Regional and Vertical Industry Coverage, Leading in Market Share Rankings

Relatively Broad Regional and Vertical Industry Coverage, Leading in Most Market Share Rankings

Leading in Specific Segments or Verticals in Certain Regions

Market Application Capabilities Need Improvement

- **The "Technology Innovation" of Big Data Service Providers is Represented by the Angle Between the Origin and the Y-Axis (Angle):**

Technology innovation primarily assesses service providers' technical strengths in areas such as intelligent data lakes, lakehouse integration, elastic scaling, and AI integration. Providers need to demonstrate leadership in data storage, fault tolerance, and high availability solutions, as well as support for real-time data processing and intelligent decision-making. The larger the angle, the stronger the provider's technical capabilities; 360 degrees represents full marks for technological innovation.

- **The "Customer Service" of Big Data Service Providers is Represented by the Distance from the Origin to the Center (Radius):**

Customer service is evaluated based on localized support in the Asia-Pacific market, data security, and compliance solutions, particularly in terms of compatibility with data, interfaces, deployment, and risk management capabilities. It also assesses technical support, after-sales service, and the ability to provide tailored solutions for complex data needs to enhance customer satisfaction and competitive advantage. The larger the radius, the stronger the provider's customer service capabilities.

Key Research Findings

Huawei Cloud、AWS、Microsoft Azure、Google Cloud、Alibaba Cloud

have been identified as "Leaders" in the emerging Asia-Pacific big data services market.

- They leverage advanced technologies such as intelligent data lakes, lakehouse integration, elastic scaling, and AI integration to enhance application data security, technical compatibility, and cloud-native application development and deployment capabilities, making big data platforms more secure, advanced, and user-friendly. Additionally, these providers demonstrate strong market performance across various application domains and consistently offer comprehensive services to meet their customers' diverse needs.

Cloudera、Databricks、IBM、Snowflake

have been identified as "Challengers" in the emerging Asia-Pacific big data services market.

- These challengers drive their growth by increasing product cost-effectiveness, differentiated competition, and offering a more open big data ecosystem. They possess clear advantages in specific regions or industries and actively expand their market share while continuously improving their technology and service levels to meet customer needs.

Teradata、Greenplum、Oracle

have been identified as "Experts" in the emerging Asia-Pacific big data services market.

- These expert providers, as niche players, focus on specific areas and have the potential to develop high-quality application products and technological innovations. They possess specialized technical expertise and extensive experience in enterprise-level big data platforms and data warehouses, enabling them to offer customized solutions that meet specific business needs.

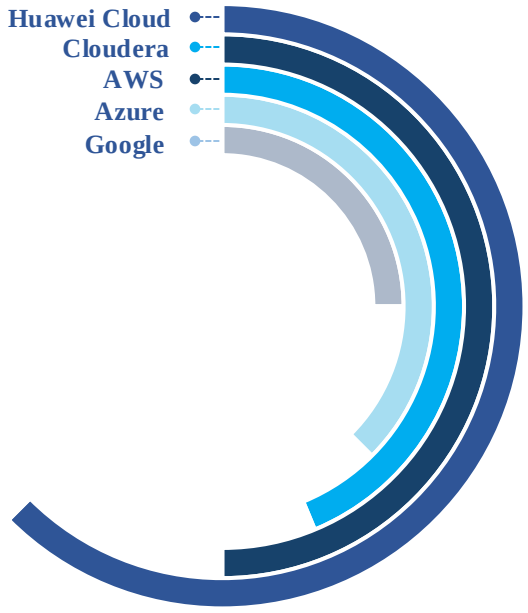
Sources: Frost & Sullivan

Revenue Performance of Big Data Service Providers in the Telecom and Government Industries in 2023: Huawei Cloud and Azure Dominate

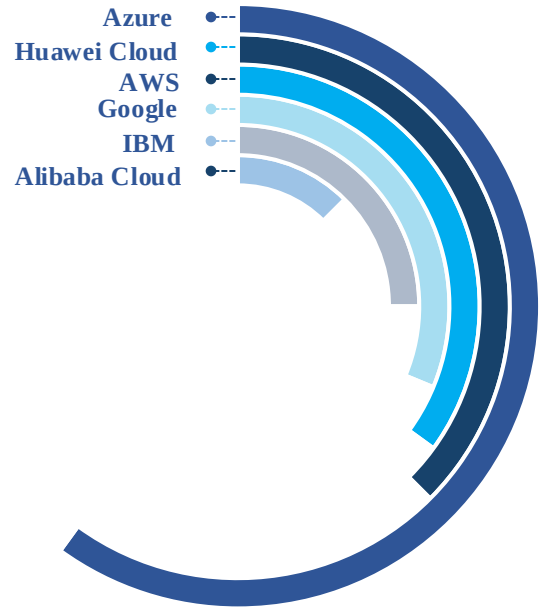
Major Big Data Service Providers' 2023 Revenue, Categorized by Industry Application

Unit: Million USD

Revenue of Big Data Service Providers in the Telecom Industry, 2023



Revenue of Big Data Service Providers in the Government Sector, 2023



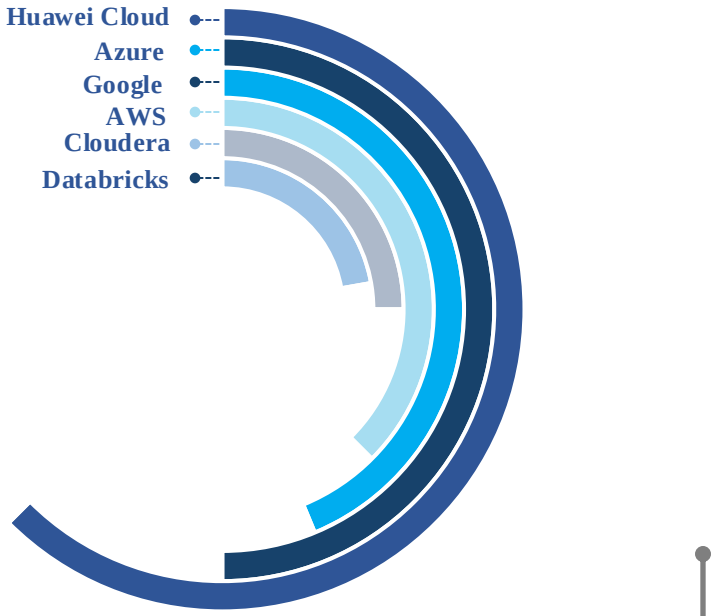
Sources: Frost & Sullivan

Revenue Performance of Big Data Service Providers in the Financial and Internet Industries in 2023: Azure, AWS, and Huawei Cloud Lead, with Google Close Behind

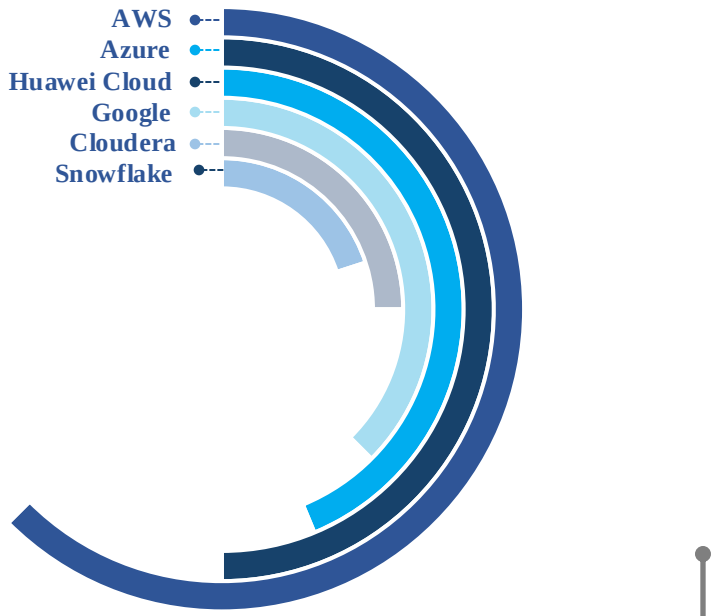
Major Big Data Service Providers' 2023 Revenue, Categorized by Industry Application

Unit: Million USD

Revenue of Big Data Service Providers in the Financial Industry, 2023



Revenue of Big Data Service Providers in the Internet Industry, 2023



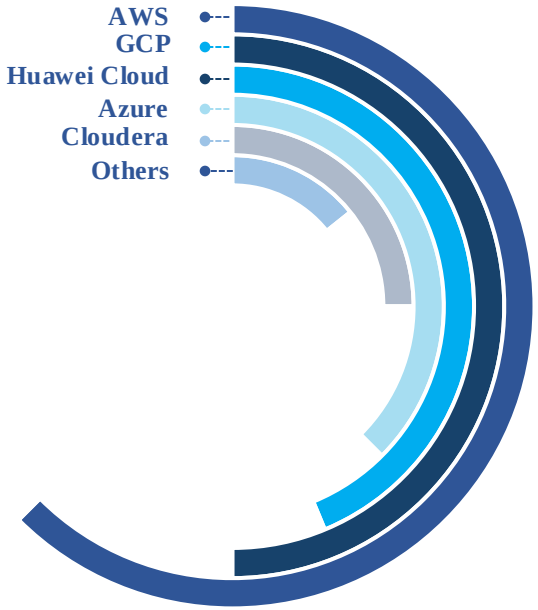
Sources: Frost & Sullivan

Big Data Service Market Share in Singapore and Indonesia in 2023: AWS and GCP Lead, Followed by Huawei Cloud, Azure, and Cloudera

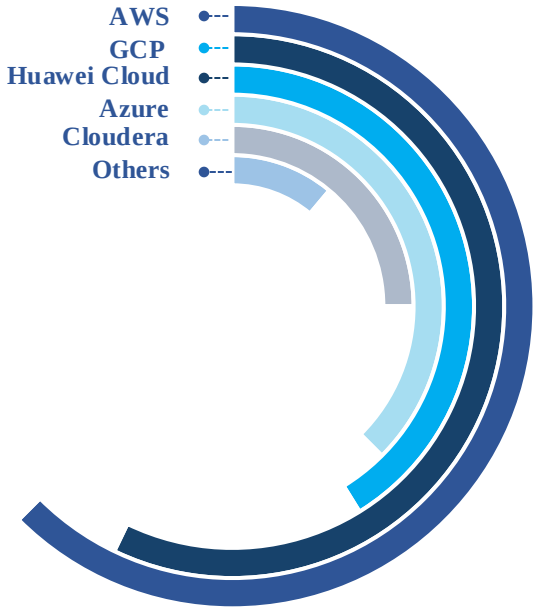
Major Big Data Service Providers' 2023 Revenue, Categorized by Industry Application

Unit: Million USD

Market Share of Big Data Service Providers in Singapore, 2023



Market Share of Big Data Service Providers in Indonesia, 2023



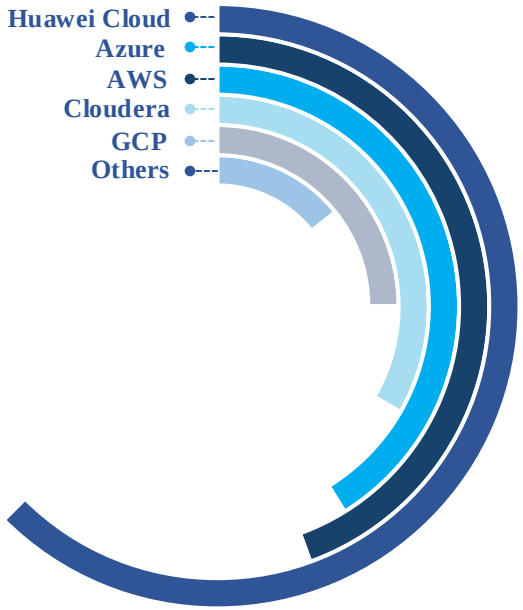
Sources: Frost & Sullivan

Big Data Service Market Share in Hong Kong and Malaysia in 2023: Huawei Cloud, Azure, and AWS Lead in Hong Kong, while Azure and GCP Dominate the Malaysian Market, with Huawei Cloud Close Behind

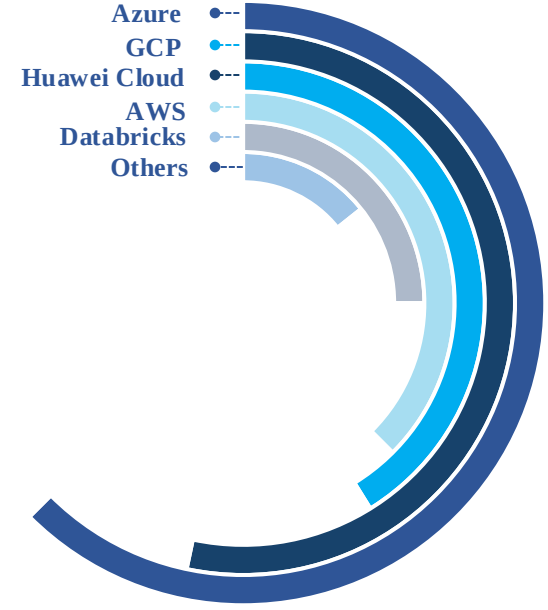
Major Big Data Service Providers' 2023 Market Share, Categorized by Country and Region

Unit: Million USD

Market Share of Big Data Service Providers in Hong Kong, 2023



Market Share of Big Data Service Providers in Malaysia, 2023



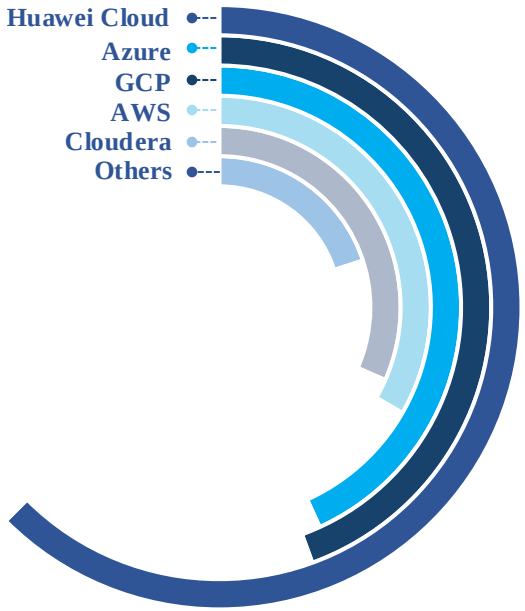
Sources: Frost & Sullivan

Big Data Service Market Share Distribution in Thailand and the Philippines in 2023: Huawei Cloud and AWS Lead, Followed by Other Providers

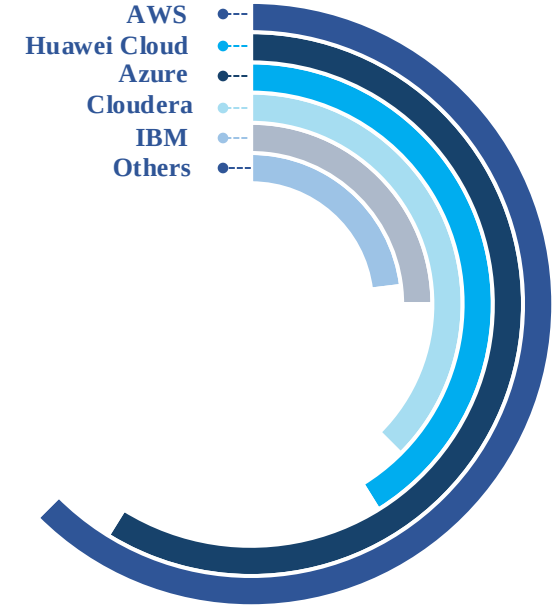
Major Big Data Service Providers' 2023 Market Share, Categorized by Country and Region

Unit: Million USD

Market Share of Big Data Service Providers in Thailand, 2023



Market Share of Big Data Service Providers in the Philippines, 2023



Sources: Frost & Sullivan

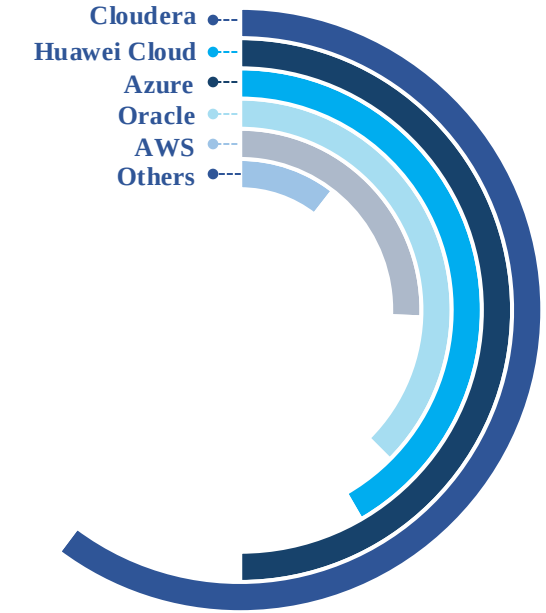
Big Data Service Market Share in Bangladesh and Sri Lanka in 2023: Huawei Cloud and Cloudera Lead the Market, Followed by AWS and Azure

Major Big Data Service Providers' 2023 Market Share, Categorized by Country and Region

Unit: Million USD

Market Share of Big Data Service Providers in Bangladesh, 2023

Market Share of Big Data Service Providers in Sri Lanka, 2023



Sources: Frost & Sullivan