AWS Economic Impact Study

AWS Investment in Indonesia

AWS Economic Development | 2021

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Executive summary

Rp 71 trillion

Investment associated with AWS region in Indonesia over the next 15 years

Rp 155 trillion

Increase in GDP due to construction and operation associated with AWS region in Indonesia over the next 15 years

24,700

Average annual jobs supported due to construction and operation associated with AWS region in Indonesia over the next 15 years

AWS is launching the AWS Asia Pacific (Jakarta) Region in Indonesia. This new AWS Region will enable Indonesian customers with data residency requirements to store their data in Indonesia, with the assurance that they retain complete control over the location of their data. Importantly, the new AWS Region will provide customers with additional options to comply with data residency, data privacy, and other existing and future regulatory requirements.

The AWS investment in Indonesia will also bring cutting-edge cloud technology to local industries and governments, accelerating the transformation of Indonesia's digital economy and helping Indonesian enterprises across many industries increase their digital adoption of technologies by harnessing the power and flexibility of cloud services. The AWS Region investment supports the national industrialization and digital agenda, as outlined in the "Making Indonesia 4.0" plan.[1] Limited cloud infrastructure in Indonesia is one of the barriers towards modern manufacturing: a production system based on connectivity between people, machines, and real-time data. The AWS investment will make high-tech cloud infrastructure available to Indonesia's public sector, businesses and people.

[1] Ministry of Industry report can be accessed here: https://www.kemenperin.go.id/download/19347

AWS is planning to invest up to **71 trillion Rupiah** (USD 5 billion) over the next 15 years, including both capital and operating expenditures, for the new AWS Region in Indonesia. This investment includes imports of highly specialized and proprietary equipment, as well as in-country (local) spending on construction labor and materials, utilities, and so on. This investment also includes spending on specialized software and personnel needed to help Indonesian enterprises and public sector organizations adopt the latest cloud technologies.

In addition to stimulating the digital economy, the investment associated with AWS Cloud infrastructure will add over **Rp 155 trillion to the Gross Domestic Product (GDP) of Indonesia over the next 15 years**. The GDP contribution includes value added by AWS services to Indonesia's information sector, and value added by the in-country spending on goods and services for construction and operation of AWS data centers. The AWS investment will also **sustain on average 24,700 direct and indirect jobs annually over the next 15 years**. These jobs will be part of the AWS supply chain in Indonesia, including construction, facility maintenance, electricity, telecommunications, and jobs sustained in the broader Indonesian economy through the spending power of AWS employees.

Our AWS Region investment will enable more Indonesian businesses of all sizes to access and leverage the benefits of the cloud

Our AWS Region investment will **enable more Indonesian businesses of all sizes to access and leverage the benefits of the cloud** as we continue our outreach to Indonesian businesses. Many Indonesian firms already use AWS Cloud in ways that help them innovate and grow their businesses. In times of COVID-19 pandemic difficulties, Indonesian enterprises and startups are using AWS-powered applications to better navigate business challenges and serve their customers. For instance, Halodoc, a Jakarta-based health technology platform running on AWS, is helping the country handle COVID-19 challenges by providing support for the national COVID-19 vaccination, testing, and telemedicine initiatives. Likewise, Bhinneka, one of Indonesia's largest ecommerce retailers, accelerated its business growth amid pandemic challenges, and it continues to use AWS to be more responsive to over 500,000 businesses.

AWS maintains **a strong commitment to all customers, including startups, enterprises, government agencies, and communities**. Since 2017, the AWS Startup team has helped more than 1,700 Indonesian startups build and scale their businesses on AWS. AWS also empowers enterprises with AWS classroom training courses, developed by our experts, to help businesses in Indonesia build the cloud skills they need to accelerate innovation and achieve business goals. Through multiple and diverse programs and initiatives, such as **support for the "Freedom of Learning" (Merdeka Belajar) national initiative** with the Ministry of Education and Culture, AWS has shown a strong commitment to drive digital skills training and learning for Indonesia's workforce and students.

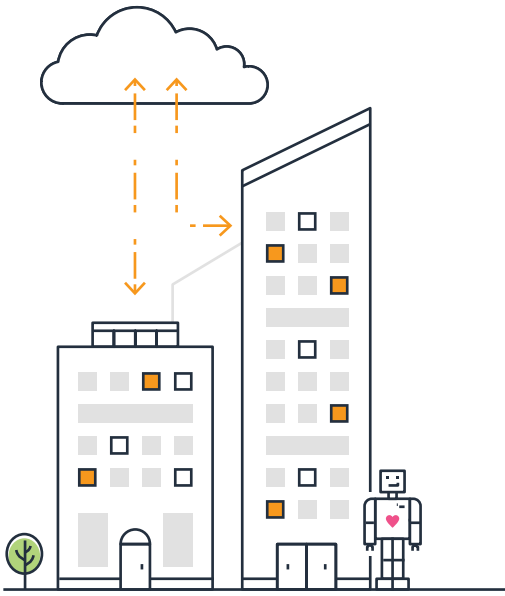
In conclusion, our investment in an AWS Region in Indonesia will bring wide-ranging economic benefits. Our continued efforts will empower businesses (including small and medium-sized businesses), workers, and students with important cloud skills that will help build a competitive and digital Indonesia. The significant growth of our presence in the region marks the confidence AWS has in Indonesia's digital ecosystem and economy. We look forward to working closely with the government of Indonesia to affirms our strong relationship as we jointly work toward driving progress for Indonesia's digital aspirations.

Planned AWS investment **in Indonesia**

AWS is launching the AWS Asia Pacific (Jakarta) Region in Indonesia. AWS Regions are physical locations around the world with clusters of data centers. Each group of logically connected data centers is called an Availability Zone (AZ). Each AWS Region consists of multiple, isolated, and physically separate Availability Zones in a geographic area. Unlike other cloud providers, who often define a region as a single data center, the multiple AZ design of every AWS Region offers advantages for customers. Each AZ has independent power, cooling, and physical security, and is connected by redundant, ultra-low latency networks. AWS customers focused on high availability can design their applications to run in multiple AZs to achieve even greater fault tolerance. AWS infrastructure Regions meet the highest levels of security, compliance, and data protection.

The key contribution of our investment to the Indonesian economy is the value that AWS customers in Indonesia will obtain by accessing the latest cloud technologies available in the new AWS Region. The new AWS Region will enable local customers in the government sector and regulated industries (such as banking) to store their data onshore in Indonesia. In addition, customers will be able to run latency-sensitive portions of applications locally to end users and resources in Indonesia, delivering single-digit millisecond latency for use cases such as media and entertainment content creation, real-time gaming, reservoir simulations, electronic design automation, and machine learning.

The unique organization of the AWS infrastructure fosters continued development in the local economy, as the capacity is progressively expanded to support growing customer demand. AWS plans to make ongoing investments in Indonesia, cumulating to **Rp 71 trillion over the next 15 years**. The planned investment includes imports of highly specialized and proprietary equipment, as well as in-country (local) spending. The local spending involves capital expenditures on construction labor and materials, as well as millions of dollars of recurring operating expenditures, such as employee and contractor compensation, utilities, facility costs, and goods and services purchases from regional businesses. Furthermore, to better support the operation of our data centers, we invest in local public infrastructure improvements, including roads, water, sewer, power, and fiber.



In this study, we provide quantitative estimates of the additional economic impact produced by our significant expenditures associated with the ongoing construction and operation of AWS data centers in Indonesia. Using the input-output methodology and data provided by Statistics Indonesia (*Badan Pusat Statistik*), we estimate AWS investments will add over **Rp 155 trillion to Indonesia's GDP over the next 15 years**. The GDP contribution includes value added by AWS services to Indonesia's ICT sector, as well as the added value created by Indonesian firms that will provide goods and services purchased by AWS to support construction and operation of AWS data centers.

The in-country portion of the AWS investment will sustain on average 24,700 jobs annually over the next 15 years. These jobs include:

- 1,300 jobs sustained by the Direct Effects — jobs in the AWS supply chain, such as construction, facility maintenance, electricity, telecommunications; these jobs do not include direct hiring by AWS in Indonesia.

- 2,400 jobs sustained by the Indirect Effects – jobs in sectors that support AWS supply chain, i.e. these jobs are supported when AWS suppliers spend the funding received from AWS on procuring labor, materials, and services needed to fulfill the work for AWS.

- 21,000 jobs sustained by the Induced Effects – jobs in the broader Indonesian economy. Over next 15 years, AWS will spend hundreds of millions of dollars in employee compensation for its data center employees, sales account managers, solutions architects, etc. The additional spending power from this income will support jobs in the broader Indonesia economy, primarily on sectors that support household consumption.

Measuring Economic Impact

Direct Effects

Investments in construction and expenditures for operations

Indirect Effects

Inter-industry and supply chain spending

Induced Effects

Household income spending in local economy

AWS in Indonesia: an engine of **growth for the digital economy**

The new infrastructure Region adds to AWS's ongoing investment in Indonesia. In 2018, AWS opened a corporate office in Jakarta, which now employs 150 full-time employees, and the number grows every year. These are high-skill jobs in areas such as solutions architects, account managers, sales representatives, professional services consultants, technical account managers, software development engineers, and cloud experts. In addition, AWS maintains a vibrant partner ecosystem in Indonesia as part of the AWS Partner Network (APN), which includes management and technology consulting companies, as well as independent software vendors (ISVs) and systems integrators (SIs) who build innovative solutions and services on AWS. Indonesian partners include Accenture, BlazeClan, Cloud Comrade, InfoFabrica, PT Innovation Cloud Services, PT Metrodata Electronics, PT Central Data Technology (CDT), Right Cloud, Westcon-Comstor, Jojonomics, and Fatiha Sakti. Together, AWS employees and partners help AWS customers in Indonesia adapt cloud technology to their needs.

AWS locations in Indonesia

Note: This map is a stylistic representation meant to convey the location of AWS infrastructure in Indonesia. It is not meant to represent an accurate or complete map of Indonesia

Many Indonesian firms already use AWS Cloud technology to help them innovate, grow their business, and, in recent times, assist Indonesia during the Covid-19 pandemic. **The following case studies illustrate the diverse ways in which AWS Cloud benefits Indonesia.**

AWS powers the leading lifestyle booking platform in Southeast Asia

> "Traveloka was born in the cloud, and our rapid growth and success are largely attributable to the decision to be natively digital. AWS has been an essential partner for our natural evolution as a lifestyle superapp,"
>
> – Ray Frederick, CTO, Traveloka

Traveloka is Southeast Asia's lifestyle super-app with a comprehensive ecosystem from the core travel offering, to local services and financial services. The super-app scaled its services on AWS, now providing customers with an end-to-end solution for customers' lifestyle needs and aspirations across 7 countries: Indonesia, Thailand, Vietnam, Singapore, Malaysia, the Philippines, and Australia. AWS technologies armed Traveloka with the speed, flexibility, and agility to swiftly build its solutions and scale at will. "Traveloka was born in the cloud, and our rapid growth and success are largely attributable to the decision to be natively digital. AWS has been an essential partner for our natural evolution as a lifestyle superapp," said Ray Frederick, CTO, Traveloka. "To date, we have brought forth more than 20 products and countless innovations. Thanks to dozens of AWS services that have powered our growth since day one with its stable, secure, and scalable platform, making it possible for us to enrich millions of lives of our users at once, in any situation," Ray added.

Indonesia's top e-commerce website Bhinneka is using AWS to accelerate growth

Since moving their IT architecture to AWS, Bhinneka has transformed its nearly 30-year-old business to become Indonesia's top ecommerce website. By using tools such as AWS Lambda, Bhinneka has cut software development time by 50 percent in some instances. That has freed up resources to develop new inventory-prediction applications and chatbots to assist online customers. "Without AWS, we could not have gone from idea to implementation as quickly as we have. That's helping accelerate development of our marketplace much faster than ever before," said Andi Putra, Chief Technology Officer of Bhinneka. "Our move from Microsoft to AWS has allowed us make more cost-effective decisions, reducing our spend by 30 percent. Our customers have relied on us as a brick-and-mortar store since we started three decades ago. Now AWS has enabled us to embrace a new business model, to deliver our goods and services to our customers wherever they are located."

Digital health startup Halodoc supports national COVID-19 vaccination, testing, and telemedicine during the pandemic

Halodoc, an Indonesian digital health startup, helped accelerate the national COVID-19 vaccination program for Indonesian citizens through its partnership with the Health Ministry. Through its digital registration and drive-thru service posts, Halodoc continues to provide safer and more comfortable facilities for COVID-19 vaccination recipients. It also helped the government with monitoring and evaluating the vaccination rollout, and played an important role in providing testing and telemedicine services throughout the pandemic. This was made possible through a support network of 20,000 licensed doctors; 2,000 hospitals, clinics, and labs; and 4,000 registered pharmacies located in hundreds of cities in Indonesia and connected by AWS. "Throughout the spread of the virus, there has been a spike in traffic and transactions at Halodoc," said Alfonsius Timboel, Halodoc's Chief Product Officer. "The capacity of our servers must be strong to address this. If the servers were still conventional, we would have had to buy additional server racks and employ more people. With AWS everything can be systemized and operate in real time according to market demand."

Digital education platforms such as Simak Online give students freedom to learn anywhere, anytime

Today, students expect to meet their need of accessing education from anywhere, at any time, to learn about any subject. The Indonesian government has realized the need for this new learning model under the national movement of Learning Freedom ("Merdeka Belajar"). This need is amplified during the pandemic, where classes must be conducted remotely using online platforms for millions of students throughout the country. One education app that serves this demand is Simak Online, which is used by 300,000 students from 530 schools across Jakarta. Using the app, students access their learning materials and assignments, complete homework, take exams, and participate in online forum discussions. Teachers use the app to prepare lesson plans and analyze students' work, while parents or guardians can monitor students' grades and achievements. Simak Online was previously hosted in on-premises facilities, but migrated to AWS before COVID-19 broke out in Indonesia—just a week before schools closed and remote learning was introduced in March 2020. Rizki Akmanda, CEO of Simak Online, is grateful. "Previously, our server could only accommodate 50 schools simultaneously holding school exams," said Akmanda. "Thanks to AWS, scalability can be increased and decreased as needed. If there is a sudden increase in activity, the server can replicate and scale itself, which was not possible with our on-premises servers." This is how cloud computing helps support the national goal of liberating students to learn.

AWS support for startups, **training** and **workforce development programs** in Indonesia

A country with strong digital potential and aspirations, like Indonesia, requires strong support for startups and digital skills training. AWS supports both the growth of startups in Indonesia and diverse training and certification programs to help students and professionals develop in-demand cloud skills. Skilled workers are critical to building a mature digital economy and increasing digital adoption of technologies in Indonesia.

AWS support for startups in Indonesia

Startups are a key source of growth in Indonesia's digital economy. Since 2017, the AWS Startup team has helped more than 1,700 Indonesian startups build and scale their businesses. AWS supports startups through AWS Activate credits, technical assistance, and education. The AWS Startups team continues to support incubation programs in universities to ensure that we are empowering the next wave of student entrepreneurs. So far, the team has worked with seven universities in the area, with plans to expand this collaboration to all leading universities in Indonesia.

AWS support for the "Freedom of Learning" (Merdeka Belajar) national initiative

AWS is collaborating with the Ministry of Education and Culture as a part of the Merdeka Belajar ("Freedom of Learning") initiative. Particularly, the AWS Semester project, a model that seamlessly embeds three semesters (AWS foundational and associate level learning, project-based learning and internship) into a regular four-year degree program for university students. The program is endorsed by Ministry of Education and Culture in Indonesia as part of the "Freedom of Learning" national initiative. In the pilot phase this year, the AWS team guided 5 top universities (BINUS University, Institut Teknologi Sepuluh Nopember, Universitas Gadjah Mada, Universitas Hasanuddin, and Universitas Indonesia) to complete AWS Semester I &II. Over 200 students graduated, 61 faculty members trained via AWS Academy with 35 certified at Cloud Practitioner Essentials and 14 certified at Associate level. The 200+ AWS skilled graduates will be offered internship among major employers in Indonesia who are AWS customers and partners.

AWS Academy

AWS collaborates with higher education institutions to help Indonesian students build in-demand cloud skills before entering the workforce. AWS Academy provides higher education institutions with a free, ready-to-teach cloud computing curriculum that prepares students to pursue industry-recognized certifications and in-demand cloud jobs. With free training and support from AWS, educators earn AWS Certifications and teach the learning materials directly to students. In Indonesia, students at Telkom University, Universitas Gajah Mada, Universitas Hasanuddin, and Universitas Klabat can take AWS Academy courses.

Laptops for Builders

The AWS “Laptops for Builders” program, unique to Indonesia, is designed to teach high school and vocational students about cloud fundamentals. The free program collaborates with local organizations Sagasitas (a community-based organization focused on coaching high school students) and Nahdatul Ulama (a boarding school with over 28,000 centers across Indonesia). AWS provides instructor training and donates laptops to aid learning. Instructors from Sagasitas and Nahdatul Ulama conduct webinars with schools across Indonesia to teach a free one-day cloud computing course and distribute laptops. The course, taught in Bahasa Indonesia, introduces students to cloud computing and key AWS services. Following the one-day introduction, students can access 12 free cloud career pathways from AWS Educate, covering topics such as machine learning, cybersecurity, and web development. So far in 2021, Laptops for Builders has reached students in 205 schools across 32 cities in Indonesia.

AWS Educate

AWS Educate provides students with online, self-paced cloud learning resources at no cost. Learners can complete any of our 12 cloud career pathways, explore hundreds of hours of content localized in Bahasa Indonesia, and earn credentials. Through AWS Educate, students can access content and programs developed to help them gain skills for cloud careers in growing fields. AWS Educate also connects companies hiring for cloud skills to qualified student job seekers through the AWS Educate Job Board.

Digital Talent Scholarship national program

AWS is collaborating with the Ministry of Information and Communication (Kominfo) on the Digital Talent Scholarship national program, which provides resources and a platform for youths to gain digital skills in Indonesia. In 2021, the program features three AWS Academy courses, including AWS Academy Cloud Foundations, AWS Academy Cloud Architecting, and AWS Academy Cloud Developing, each of which helps students prepare for an industry-recognized AWS Certification exam to validate cloud knowledge. In this program, AWS provides course content, lesson plans, and authorized instructors to deliver training content. Students can apply to the free upskilling program through Kominfo.

Free online education

AWS offers a library of free digital training courses, built by AWS experts, available on demand. We currently offer 150 free digital courses in Bahasa Indonesia, with more localized content coming throughout 2021. Indonesian learners can browse the course library and choose from fundamental, intermediate, and advanced training to build cloud knowledge on topics such as cloud essentials, security, machine learning, data analytics, and Internet of Things (IoT). Our most popular digital training course, AWS Cloud Practitioner Essentials, gives learners who are new to the cloud a six-hour overview of AWS Cloud concepts, including AWS Cloud services, security, architecture, pricing, and support.

In addition, AWS collaborates with Dicoding, a tech-education startup in Indonesia, on a cloud and backend developer scholarship program. This program, free to the first 100,000 learners nationwide (professional developers, IT teachers and lecturers, and university students), includes a comprehensive backend development curriculum, localized in Bahasa Indonesia, to provide an accessible learning journey for Indonesian developers. The program features a learning path with six self-paced digital courses designed by AWS, such as Backend App for Beginners and Becoming a Backend Developer Expert. The courses are designed to help learners achieve an industry-recognized AWS Certification.

Empowering Indonesian organizations with AWS Cloud skills

AWS classroom training courses, developed by our experts, can help Indonesian organizations build the cloud skills they need to accelerate innovation and achieve business goals. We offer virtual classroom training courses taught live by expert instructors who teach businesses using a mix of presentations, discussions, and hands-on labs. In 2021, AWS subsidized classroom training courses for many of our customers in Indonesia to help organizations build cloud skills for free in advance of the new Asia Pacific (Jakarta) Region launch.

AWS and sustainability

Our Climate Pledge to achieve net zero emissions

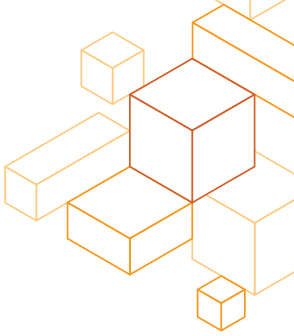
As part of Amazon's Climate Pledge, Amazon (and AWS as part of it) is committed to reach net zero carbon emissions across its business by 2040, and ten years ahead of the Paris Agreement goals. We see ourselves as strong partners in working with the government and Indonesian businesses to help achieve emissions reduction targets.

A key component of our commitment to net zero is powering Amazon's infrastructure with 100 percent renewable energy, and the company is now on a path to achieve this milestone by 2025, five years ahead of the initial 2030 target. As of December 2020, Amazon became the world's largest corporate purchaser of renewable energy Amazon has 232 renewable energy projects across the globe with over 10,000 megawatts (MW) of renewable capacity and deliver more than 23 million megawatt hours (MWh) of energy annually—enough to power the equivalent of more than 2 million US homes.

Achieving emissions reductions on the AWS cloud

AWS is committed to running our business in the most environmentally friendly way possible We seek to grow the use of renewable energy in the grids powering AWS data centers, achieving 100 percent renewable energy usage for our global infrastructure. In addition to helping our customers increase agility and reduce costs, moving to AWS is also much more sustainable, as customers no longer have to provision for peaks, and AWS's infrastructure is designed to operate efficiently at scale.

A recent study by 451 Research (part of S&P Global Market Intelligence) showed that "moving IT workloads from on-premises data centers to the cloud would improve energy efficiency, and reduce associated carbon emissions by nearly 80% on average" (as compared to the median of 515 surveyed enterprises across Japan, South Korea, Singapore, Australia, and India). This is a result of efficiency advantages at both the server and facility levels in our cloud infrastructure. This translates into dramatically less energy used to perform the same unit of work. On the server side, AWS designs server systems with great attention to power optimization, using the very latest technology components. We run servers to higher levels of utilization, leveraging the ability to share and dynamically allocate resources on the cloud. Facility-level efficiency gains include data center designs that use lower energy methods and a leaner electrical infrastructure, resulting in lower energy losses to power distribution



Reducing water usage in AWS data centers

Recognizing the criticality of sustainable water management, AWS employ multiple initiatives to improve water use efficiency and to reduce the use of potable water for cooling data centers. AWS develops a water use strategy by evaluating climate patterns for each AWS Region, local water management and availability, and the opportunity to conserve drinking water sources.

AWS has demonstrated our commitment to water stewardship by using reclaimed or recycled water instead of potable (drinking) water in multiple regions. A key component of our water use strategy focuses on working with local utilities to expand the use of reclaimed water. In some regions, AWS installed on-site water treatment systems to remove scale-forming minerals, enabling us to use water for more cycles in our cooling units and continue to reduce our water footprint.

Thought leadership and support for sustainability innovation

The Amazon Sustainability Data Initiative (ASDI) seeks to accelerate sustainability research and innovation by supporting our customers to minimize the cost and time required to acquire and analyze large sustainability datasets. ASDI supports innovators and researchers with the data, tools, and technical expertise they need to move sustainability to the next level. ASDI currently works with scientific organizations like NOAA, NASA, the UK Met Office and Government of Queensland to identify, host, and deploy key datasets on the AWS Cloud, including weather observations, weather forecasts, climate projection data, satellite imagery, hydrological data, air quality data, and ocean forecast data. These datasets are publicly available to anyone. We are excited to bring this work on sustainability innovation to our customers and partners in Indonesia, and to share our own lessons, strategies and tools for successfully identifying, reducing and reporting on climate emissions.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