HARNESSING THE DIGITAL DIVIDEND

How the cloud drives value in Southeast Asia

Microsoft

OXFORD ECONOMICS

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Cloud computing is giving industries, governments and non-profit organizations in Southeast Asia unprecedented potential to join the knowledge economy. It is boosting growth and innovation, giving even small businesses the ability to scale rapidly, and creating new sources of revenue and high-paying jobs.

FOR parts of the region that have long suffered from a relatively underdeveloped IT landscape, cloud computing offers an opportunity to grab a greater share of the globe's digital dividend.

Across Southeast Asia, cloud computing is ubiquitous enough that many consumers may not realize they are using it when they open a favorite shopping app or use their mobile phones to hail a ride or book a dinner reservation. As goods and services become more digitized, flexible and distributed cloud platforms are giving businesses of all sizes access to cutting-edge data tools, limitless storage, and sophisticated software, without forcing them to invest in expensive servers or computers. This makes it easier for companies to experiment with new services, expand their client footprints, or increase their ability to collaborate globally.

The transition to cloud platforms is critical for accelerating the economic development of developing economies like Indonesia, Thailand and Vietnam that hope to generate greater productivity and higher-value employment, while countries like Singapore and Hong Kong have already benefited from heavy tech investments.

Cloud helps level the playing field for smaller companies — and developing economies — by putting sophisticated technologies within reach, while allowing users to scale up or down quickly according to market factors. It gives any enterprise global reach, leverages talent and facilitates collaboration, and represents a foundational layer of infrastructure for the next generation of technologies that will drive business growth, including mobility, the Internet of Things, artificial intelligence, and Big Data analytics.

As Peter Cowhey and Michael Kleeman at the University of California, San Diego have noted, "The cloud can allow emerging economies to tap the economic gains from the move to globalization of the design, production, distribution, and support of goods and services...and its growing IT intensity. The cloud opens the way for lower- and middle-income countries to participate more fully in the world's switch to a 'knowledge economy' as both consumers and creators of knowledge based products."[1]

Indeed, an index recently published by the Asia Cloud Computing Association (ACCA)[2] shows the Asia-Pacific region continues to lead in worldwide cloud readiness and that, in fact, Hong Kong and Singapore come out as global leaders

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1   Peter Cowhey and Michael Kleeman, *Unlocking the benefits of cloud computing for emerging economies,* UCSD, https://gps.ucsd.edu/_files/faculty/cowhey/cowhey_profile_10182012.pdf
2   Cloud Readiness Index 2018 http://asiacloudcomputing.org/images/cri2018/acca-cri2018_presentation_final.pdf

High level recommendations for cloud migration

Non-profit organizations should develop a cloud strategy along with their mission statements, because cloud investments can meaningfully increase their effectiveness and social impact while reducing capital costs for IT.

Enterprises should recognize that moving to a cloud system often pays off in ways not primarily about cost savings. Cloud can meaningfully reduce time-to-market, offer greater flexibility to respond to customer needs, and boost prototyping and experimentation.

Governments should recognize that cloud systems work best when the underlying infrastructure is robust and reliable. They should focus on improving broadband connectivity, ensuring electrical supplies are reliable, and boosting international internet connectivity.

Governments can also recognize that the need for cloud system experts and data scientists will expand exponentially in the near future, so they should help universities and training centers boost the talent pipeline. Retraining programs should also be encouraged.

Data localization requirements can block the speed of cloud adoption, especially for smaller businesses and organizations with limited resources. Governments can expedite innovation by focusing instead on data classification, access, and security.

– ahead of the UK, Germany, and the US. Yet within the region, large discrepancies persist between individual economies, and countries like Thailand and Indonesia lag.

The Asia-Pacific region continues to lead in worldwide cloud readiness…in fact, *HONG KONG AND SINGAPORE COME OUT AS GLOBAL LEADERS* – ahead of the UK, Germany, and the US

Oxford Economics, an independent economic research firm and consultancy, investigated how the adoption of cloud computing is transforming businesses, non-profit organizations, and government institutions across Southeast Asia, with a focus on one economy with a well-developed IT infrastructure, Singapore, and on two less-developed ones, Indonesia and Thailand. Because the broad benefits and catalytic effects of the cloud make it difficult to measure precisely its economic impact – payroll or revenue data cannot capture the full extent to which cloud platforms create new business opportunities, for example – we instead developed a qualitative approach to the work.

That meant interviewing nearly a dozen companies, NGOs, and government ministries across the three countries, and then developing a series of nine micro-economic case studies of diverse organizations that are using cloud services, dealing with the challenges of deployment, and capturing value from cloud investments. We looked at the effects of cloud computing on overall business operations, including business processes, the creation and delivery of innovative services, cost reduction, revenue growth, and institutional culture.

We also used Oxford Economics' proprietary data about the region, along with other relevant research from trusted sources. One key finding: some parts of Southeast Asia have been slower to adopt the cloud, putting at risk their medium-term economic prospects.

Business and government spending on cloud software and services in the Asia-Pacific region is forecast to grow from $13 billion in 2016 to $20 billion in 2018, according to Forrester, the US market research company. Oxford Economics expects the overall economy in Indonesia, among the world's most populous nations, to grow at 5.2% per year on average through 2021, while Thailand's GDP should expand by 3.2% on average during the same period.

Yet according to the ACCA study, Thailand and Indonesia lag significantly behind most others in the region when it comes to cloud mobilization. If these two countries can accelerate the digitization of their commercial and service economies, it could spur additional, above-trend growth. Singapore, meanwhile, can maintain its regional leadership and raise its global standing by continuing to capitalize on cloud investments.

THE CLOUD IN ACTION

Oxford Economics developed case studies focused on nine organizations in Southeast Asia, including Indonesia, Thailand, and Singapore. The institutions were chosen to reflect a mix of business, government, and non-profit users, and as a way of capturing the real-world value from cloud to both large and very small companies.

NOT surprisingly, we found cloud computing makes IT departments and business operations more efficient. In one case, a multinational business user in Singapore estimated it reduced IT spending by one-third by moving to the cloud from on-premise servers. An NGO in Thailand was able to reduce spending on the number of workers required to conduct an intensive crop-certification program some 80% by moving from paper-based reports to a cloud system that inspectors can easily access via tablet or mobile phone.

Yet employment or payroll data alone may not always reflect the true cost savings generated. Migration to a cloud environment often means that a company can reduce the person-hours needed to manage its IT infrastructure, with workers redeployed to areas where they can generate higher economic value for the firm. This was true for both a multinational real estate conglomerate based in Singapore and a developer in Thailand. For one government-owned firm in Indonesia, adopting a cloud system to replace on-premise servers generated a 25% reduction in the size of the staff required — and an estimated 30% reduction in operating costs. But the company still struggles to find an adequate supply of data scientists and others with the advanced skills needed to maximize benefits from cloud migration.

Opportunities for cost reduction go well beyond payroll expenses when cloud platforms can be used to harness Internet of Things (IoT) innovations. In Singapore, a property developer generated savings of more than 10% on energy costs in a large retail complex by combining cloud with a vast array of sensors to monitor and adjust energy use.

Perhaps as important in the long term, cloud technologies enable IT and data analysis to move from cost centers to generators of new revenue. A government-owned business in Indonesia, we found, boosted its e-commerce revenue from 5% to 35% of total sales in just two years after switching to the cloud, while its mobile revenues grew 130% in a single year. These innovations represent just the early stages of new business-model innovations that could emerge as cloud technologies become more mature.

The impact of cloud adoption extends far beyond the IT department. Our interviews revealed that organizations in Southeast Asia are increasingly seeing value on numerous fronts, including:

- **Network effects.** Cloud architecture gives organizations an ability to connect with global networks, improve standards, and boost reputations. In a number of cases studied, institutions in Southeast Asia felt obliged to adopt cloud technologies to become full participants in global alliances, or to signal adherence to international standards of quality. Because so many other organizations are moving to the cloud, cloud adoption gives organizations far greater access to a global ecosystem of innovation and innovative applications.

- **Prototyping and flexibility.** On-demand services allow programmers to experiment more easily with new applications or web sites, rather than buying additional servers in advance. In Indonesia, for example, a giant conglomerate can experiment more readily because it no longer needs to spend two to three months to procure a new server, and does not need to develop a forecast of future demand to justify the investment. In several organizations, this approach led to increases in experimentation and accelerated development of new products and services.

- **Collaboration.** The accessible, global nature of cloud computing allows organizations to share data and team up more effectively both internally and with partners or vendors, wherever in the world they may be. At one social service organization in Singapore, the number of board meetings has been reduced and paper agendas have been eliminated, replaced by tablet computers linked to the cloud.

- **Amplification.** The scalability of cloud infrastructure allows organizations to amplify their presence more effectively and connect more easily with customers and clients. It offers small organizations, like a social-change agency in Thailand, the potential to create a large footprint with like-minded activists.

- **Analysis.** Cloud systems help generate new sources of revenue by allowing data scientists to parse unprecedented amounts of data to discern behavioral patterns and customer preferences. A development group in Singapore is now using Big Data to anticipate the needs of its regular customers and to enhance an affinity program.

- **Acceleration.** As consumers across Asia grow more comfortable with e-commerce, companies are still learning how to respond to market demands with internet speed. An Indonesian company deployed a complex new sales management tool in just one month with a cloud-based development process. "My time frame is now in months and not years," the IT manager explained.

- **Empowerment.** Greater accessibility of programs and records allows employees

to spend less time in the office and more time visiting clients and customers. For a social service agency in Singapore, cloud migration allowed case workers to double the number of clients they could assist, without increasing IT spending.

Yet as with any investment, there are costs and challenges associated with cloud deployment. Among the issues we found to be most pressing to those we interviewed:

- **Price.** Subscriptions to cloud services can be costly, many users report. While organizations in Singapore may be relatively well capitalized, costs are not trivial for many in Indonesia and Thailand. Even large organizations must review cost implications. The IT director at a prominent Indonesia conglomerate told us that a 20%–30% reduction from current price levels would make cloud adoption more palatable.

- **Migration.** Moving from on-premises systems into the cloud generates uncertainty at established firms with legacy IT infrastructure. An IT director at a large conglomerate pointed to the time and effort involved as disincentives for moving legacy finance and HR systems to the cloud.

- **Security and data protection.** Many companies are wary of putting sensitive data into the cloud, although research by Gartner and others suggests that cloud security is superior to what most organizations can muster on their own; public cloud infrastructure as a service (IaaS) is expected to suffer at least 60% fewer security incidents than those in traditional data centers through 2020.[3]

- **Regulation.** National policies on data governance and hosting can be an impediment to cloud adoption. Indonesia's Government Regulation No. 82, for example, mandates that Indonesian businesses conducting electronic transactions store personal data in data centers within the country[4], and such data sovereignty regulations can slow cloud adoption.

- **IT infrastructure.** Access to the internet and underlying IT infrastructure are neither ubiquitous nor completely reliable in many parts of the region outside Singapore, so cloud use can be short-circuited. The 2018 ACCA index rates Indonesia at only 5.5 on its 10-point scale of broadband quality, while Thailand measures 6.9. (Singapore by contrast weighs in with a 9.5 score, the highest in Asia.)

- **Training and skills.** The need for ongoing training to keep up with new versions and updates of software programs can be intimidating to some users. In some parts of the region, trained data scientists – needed for higher-level applications such as Big Data analysis – remain a scarce commodity.

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3 *Is the cloud secure?* https://www.gartner.com/smarterwithgartner/is-the-cloud-secure/
4 Indonesian Government Regulation No. 82 of 2012 on Implementation of Electronic Systems and Transactions (GR 82)

IMPLICATIONS OF
CLOUD ADOPTION

These findings have important implications for policy-makers as well as corporate leaders, especially in countries like Indonesia and Thailand, which could realize major economic gains through the speedier adoption of cloud technologies.

THE explicit recognition by senior policy-makers in all three countries that cloud migration can boost economic potential and generate new and better jobs can help focus attention on the underlying areas where government investment and policy support can help accelerate the digital transformation.

In Singapore, for example, the Infocomm Media Development Authority (IMDA) is already spearheading several initiatives, like its "SME Go Digital" program, to accelerate adoption of cloud-based systems by smaller businesses, using government funds to actively assist the transformation. "We play an evangelist's role," says Samantha Fox, director of industry development and internationalization for IMDA. "We see cloud as the accelerator that allows small business to scale rapidly."

In Thailand, the government has established a committee for Big Data, data centers, and cloud computing to steer all 20 of its ministries through A STATE-LED DIGITAL TRANSFORMATION.

In Thailand, the government has established a committee for Big Data, data centers, and cloud computing to steer all 20 of its ministries through a state-led digital transformation. The move is meant to help the government handle the use of Big Data and to improve transparency, according to Pichet Durongkaveroj, the digital economy and society minister.[5] But he acknowledged that a shortage of data scientists will impede progress. Thailand is also spending upwards of US$600 million to roll out a national broadband network to better connect more than 7,000 villages in the vast Thai countryside to the internet.

5   *Bangkok Post* 'Big data panel to direct country's digital transformation' https://www.bangkokpost.com/tech/local-news/1420115/big-data-panel-to-direct-countrys-digital-transition March 1, 2018

In Indonesia, while the government has started a major infrastructure investment campaign, the lack of adequate investment to ensure that basic internet services are robust, reliable, and readily available across the country could limit the pace of digital adoption, as will GR 82. One NGO in Indonesia, for example, found its ability to manage student records for a national training program significantly hampered by internet breakdowns and frequent blackouts in electrical service. Easing data localization requirements would allow some Indonesian companies to effectively outsource some of their IT requirements.

As governments do more to prioritize upgrading and expanding basic internet access and boost IT training, technology companies may also have an affirmative role to play. They can take their own steps to help improve internet infrastructure, and coach companies and organizations on the ways cloud mobilization can accelerate growth.

ASEAN could implement an *EXPLICIT REGIONAL POLICY* to enhance and improve access to data networks and internet broadband services

In the hub-and-spoke model of routing internet traffic around the globe, Singapore remains in the fortunate position of being a hub for data communications in Southeast Asia, which means that many internet users in Indonesia and Thailand have their traffic routed through Singapore.

Lacking similar proximity to high-capacity cables, users in Jakarta or Bangkok report service limitations and breakdowns in reliability that can increase latency, slow overall performance, and reduce the attractiveness of cloud investments. A major Indonesian conglomerate has moved only cautiously to embrace certain cloud solutions, for example, because of concerns that the underlying infrastructure will be not be able to scale adequately. "In many parts of the country the response time is so slow, it really limits the attractiveness of some cloud programs," the manager explained.

Findings by the economic and social development arm of the United Nations in Asia-Pacific in 2016 indicated that nearly 75% of the region's broadband capabilities and access are concentrated in countries in East and North-East Asia. This creates enormous opportunity for nations like Indonesia and Thailand and others in Southeast Asia to generate significant new growth if they can improve their IT infrastructure, perhaps with the help of the kind of public-private partnerships that Singapore has employed.

One possible solution would be to craft an explicit ASEAN regional policy to enhance and improve access to data networks and internet broadband services. Even though the major cloud providers like Alibaba, Amazon, Google, and Microsoft compete for users across Southeast Asia, it may be appropriate for these private

players to consider organizing a joint investment in a private-public consortium that can improve direct international access to the nations of Southeast Asia that still need better internet infrastructure.

Senior government leaders, and heads of businesses and non-profit institutions alike must also recognize the role their own individual leadership can play in accentuating the cloud's capacity to transform organizations and reap digital dividends. Our research shows that greater collaboration, innovation and effectiveness results from cloud investments. Leaders need to articulate a cloud-enabled vision and ensure that effective implementation follows. That way, workers and their institutions are not left behind as the digital economy continues to grow in importance.
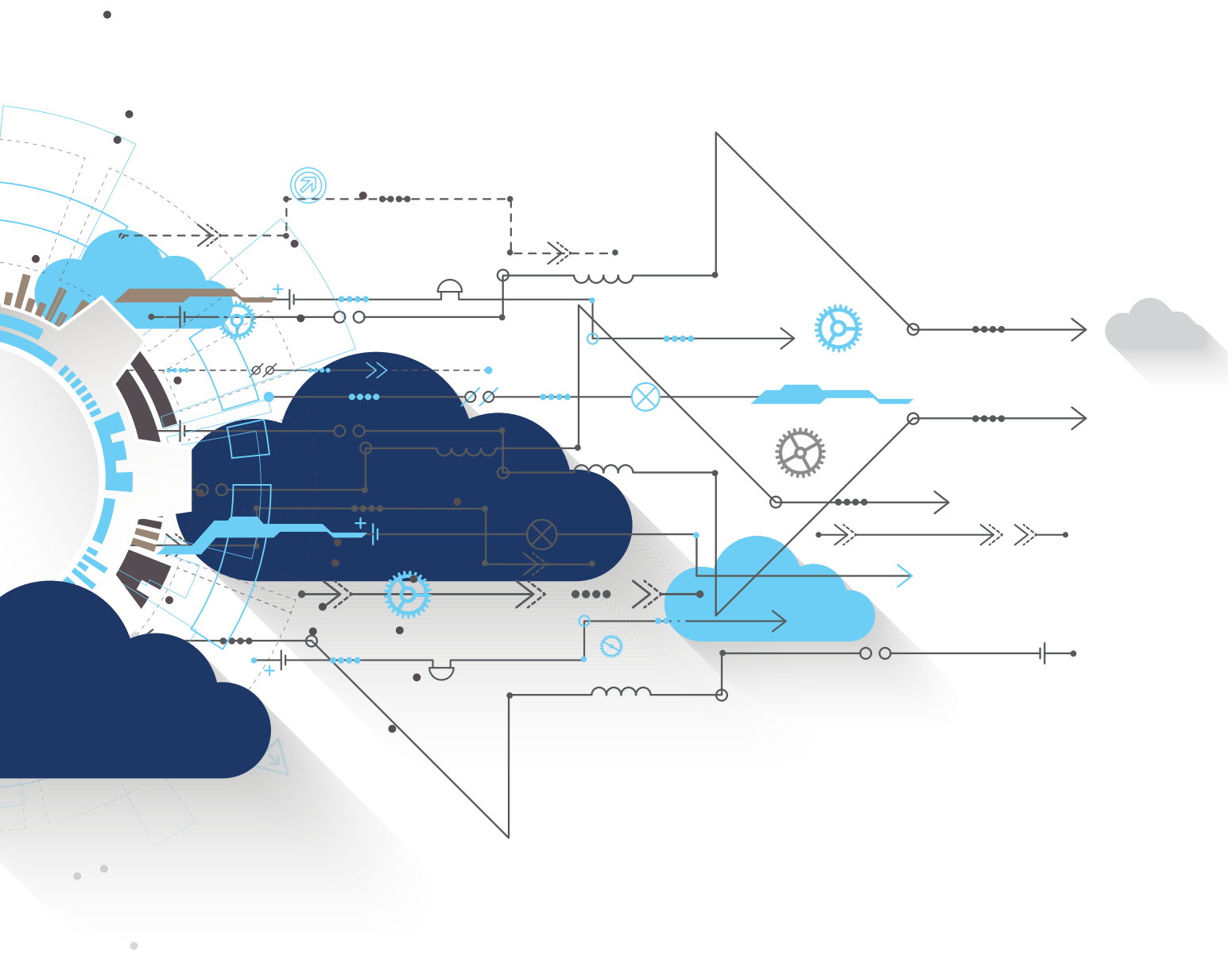
CONCLUSION

New and innovative technologies give small companies, and less-developed economies, the potential to leapfrog into the knowledge economy. Cloud platforms represent one such technology – a new way to accelerate business growth, intensify collaboration, create global networks, and scale effectively. As the costs fall, more small and medium-sized enterprises across the region can be expected to migrate toward cloud solutions.

OUR research has shown that cloud platforms can do more than cut costs and make companies more competitive. They also establish a robust IT foundation for companies to embrace the next wave of innovations, including robotics, artificial intelligence, data analytics, and the Internet of Things, to find new business models and capture new sources of revenue. There are few barriers keeping Southeast Asia from catapulting forward by more fully embracing cloud platforms, and little reason to think they cannot be overcome.

SUMMARY OF CASE STUDIES

1   *The cloud makes workers mobile and more efficient*
AWWA, Singapore

AWWA, a social service organization, introduced cloud services to allow its staff members to share case files, emails and coordinate calendars. From that basic transformation, AWWA has gone on to adopt a series of additional cloud technologies, including mobile interfaces, which now allow case workers to spend more time in clients' homes and less in the office filing paperwork.

2   *Finding new revenues and cost savings in data*
CapitaLand, Singapore

Real estate conglomerate CapitaLand created a cloud-based centralized data platform, where information from across the company can be tabulated and analyzed, to explore opportunities for cross-selling and engaging with target customers. The flexibility of cloud technologies helps encourage experimentation and speedy prototyping of new IT initiatives.

3   *The cloud gives social activists greater power to do good*
Social Technology Institute, Thailand

Social Technology Institute, a non-profit, moved its web services to the cloud, a decision it now sees as essential to boosting the capabilities and footprints of other NGOs. They have found that they can collaborate more effectively and gain more presence on a relatively low budget.

4   *Cloud technologies speed auditing capabilities*
Green Net SE, Thailand

Green Net SE is a non-profit working with farmers to produce organic, shade-grown coffee, which requires extensive auditing and record-keeping. Now, with a cloud-based mobile application, the work is done in 30 days instead of months and can be done with seven or eight people instead of 40.

5   *Using cloud to develop robust disaster recovery capabilities*
Praram 9 Hospital, Thailand

Praram 9 Hospital needed a better way to preserve patient records, keep its data secure, and create adequate disaster recovery protocols to meet international standards. Today all diagnostic and patient data generated at the hospital is stored on a cloud platform. This was also much cheaper than building a remote server facility to store patient data.

6   *A government agency moves warily into cloud computing*
Electronics Transactions Development Agency (ETDA), Thailand

ETDA is the first government entity in Thailand to adopt a cloud storage and e-mail system for use by its workers. Convincing senior government leaders was challenging, but approval did not necessarily lead to immediate change. Training, patience, and a careful roll-out to get workers up to speed also proved essential.

7   *Accelerating social change at Generasi Bisa*
Generasi Bisa, Indonesia

NGO Generasi Bisa is building the country's first Internet job site to exclusively serve young adults with only high school degrees or vocational training. There are some 2 million new graduates each year who want to work, but the problem is connecting them to jobs. Their new website hopes to address this problem, and the cloud platform makes it easier for them to explore new ideas and innovate.

8   *Cloud transformation brings speed to market for PT Astra*
PT Astra International, Indonesia

PT Astra International, an industrial and retail conglomerate, used a cloud computing platform to give as many as 6,000 automotive sales representatives and managers new tools to identify top sales prospects and contact them directly. Astra still relies on a significant number of applications that reside on the company's own servers and feels some cloud services are still too expensive to make a wholesale switch overnight.

9   *The cloud accommodates start-ups – and legacy companies too*
PT Garuda Indonesia, Indonesia

PT Garuda Indonesia, Indonesia's government-owned airline, illustrates the contrasts between greenfield development and migration of legacy assets. For one business unit, the cloud offers flexibility and the ability to experiment; for another, it represents an opportunity to improve IT performance and meet emerging global standards.

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